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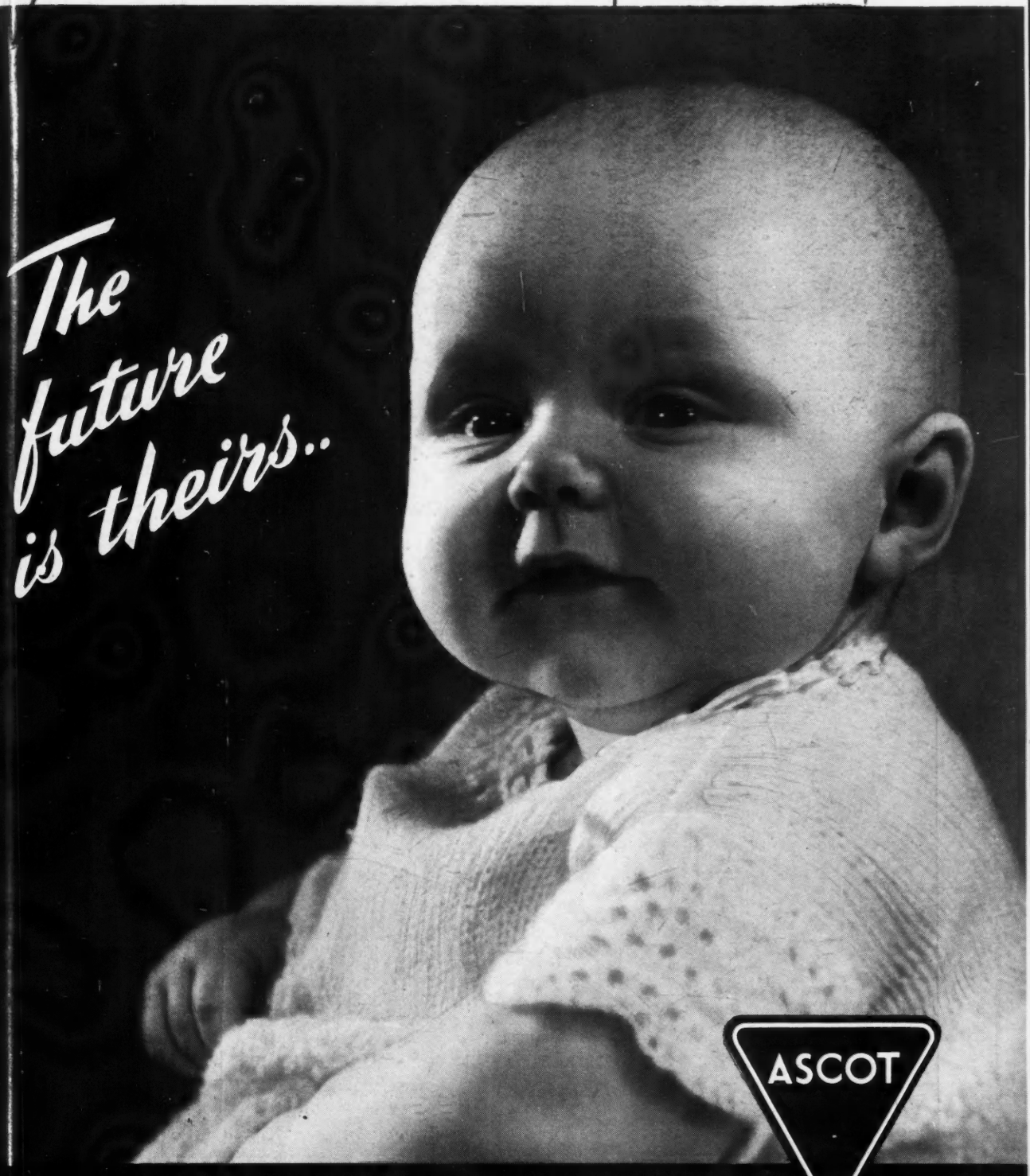

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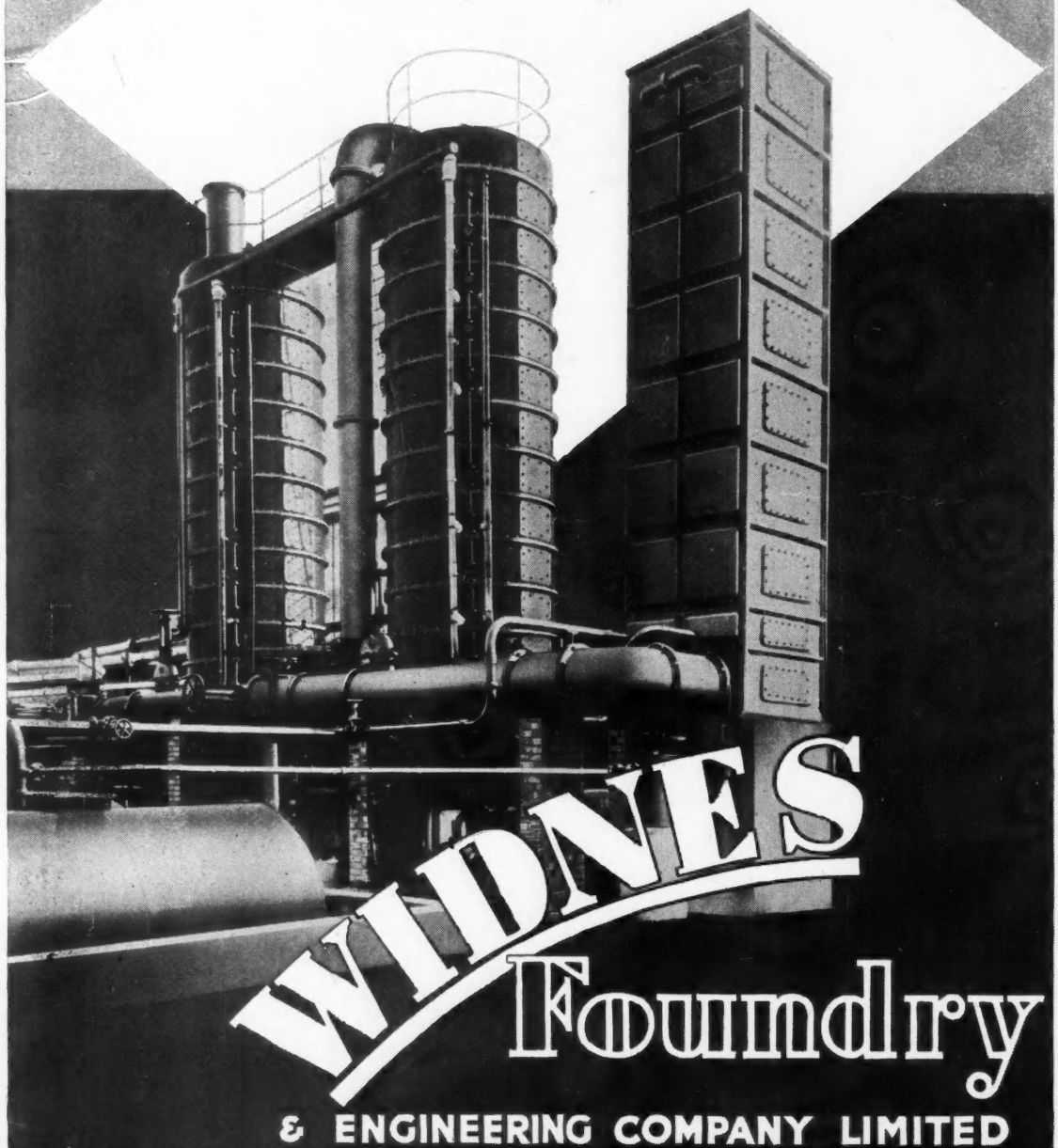

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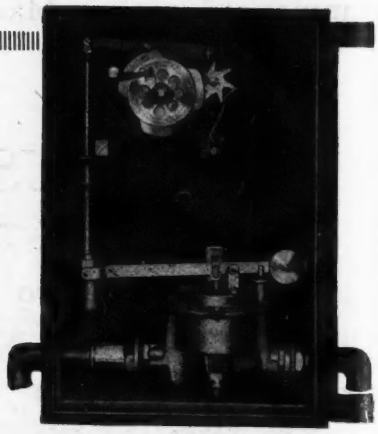

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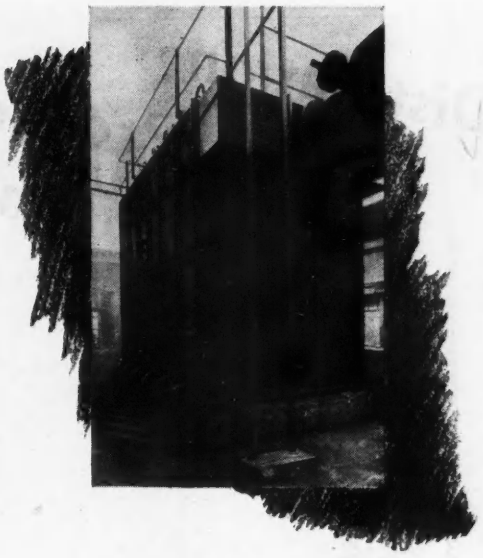

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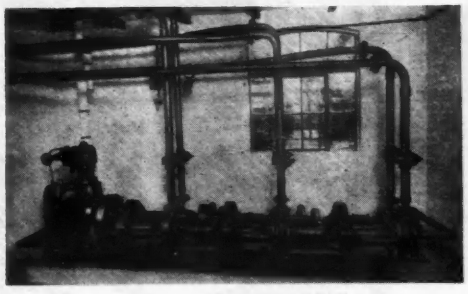

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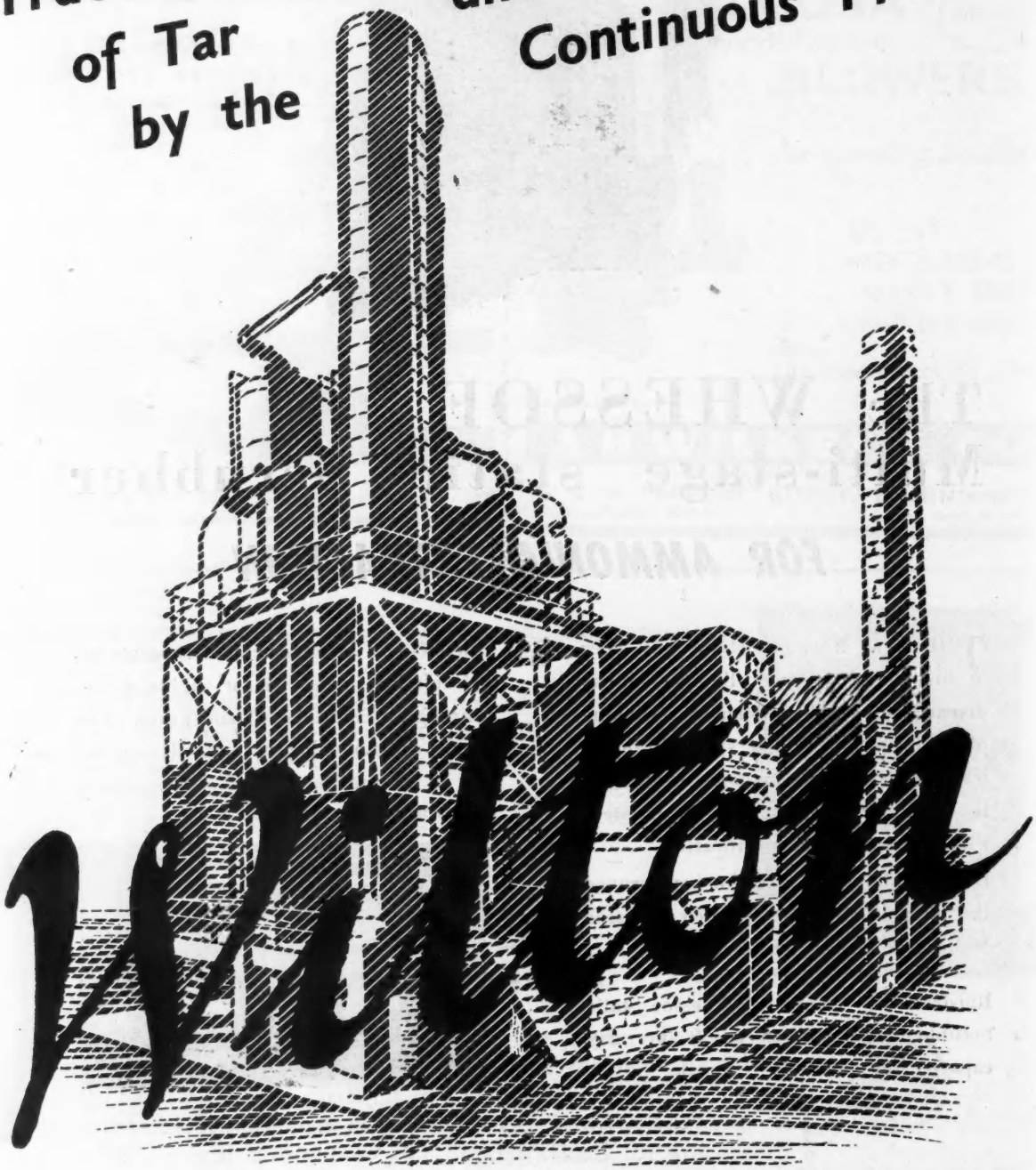

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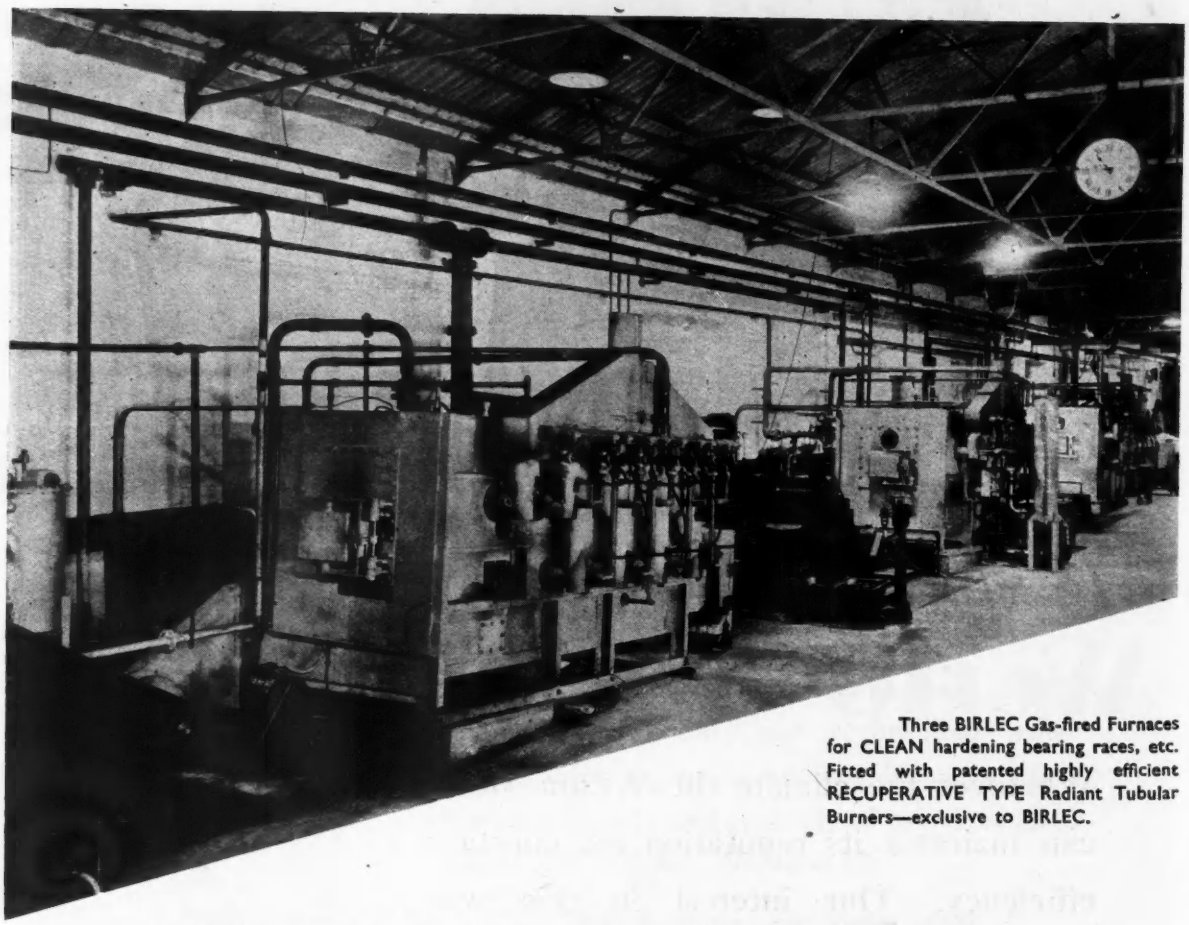

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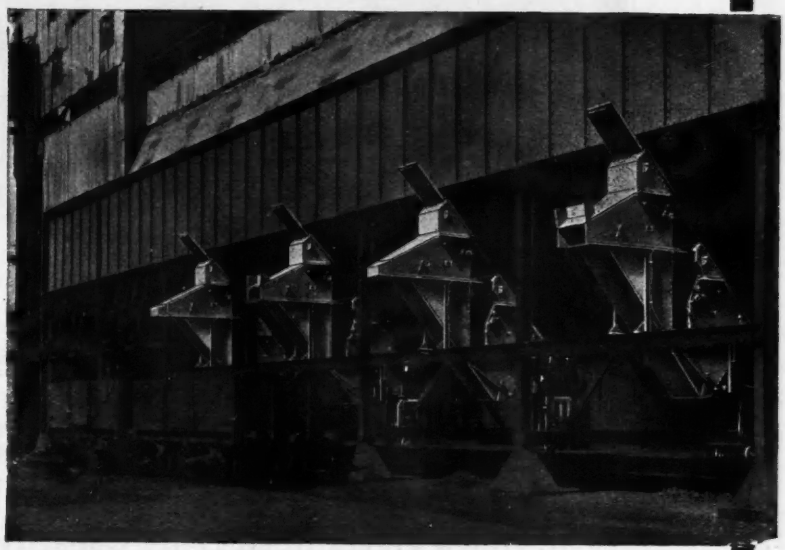

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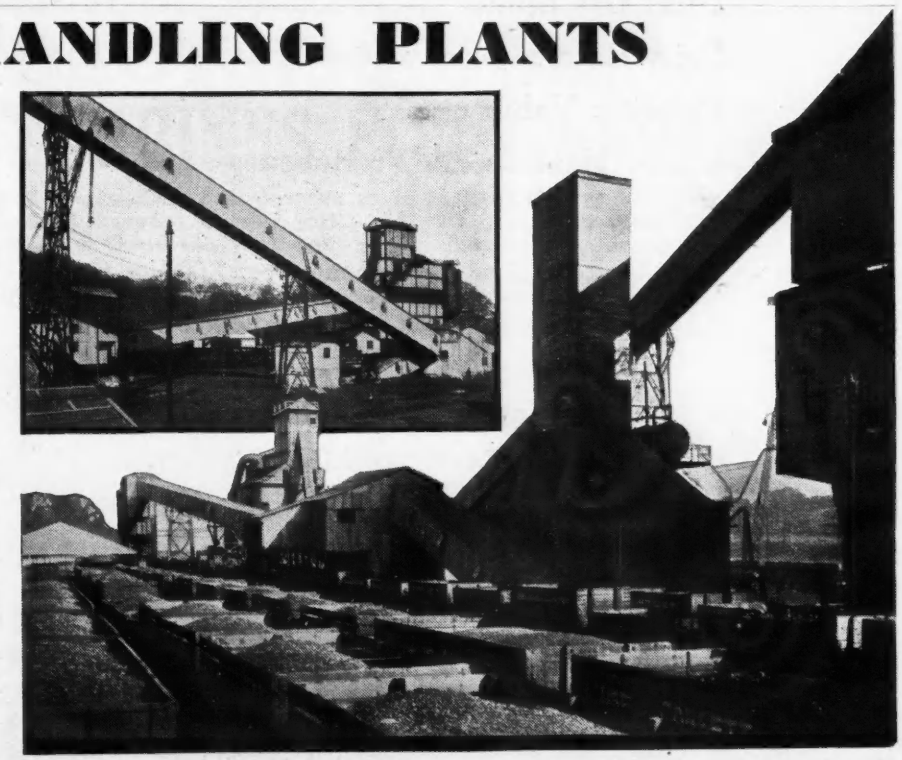

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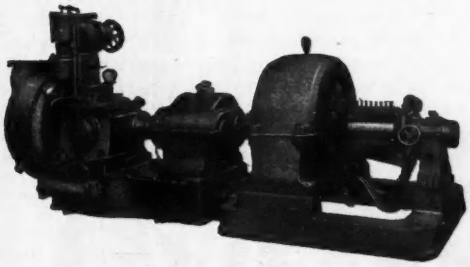

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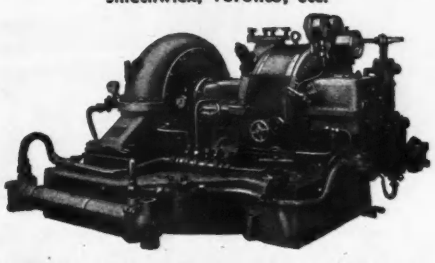

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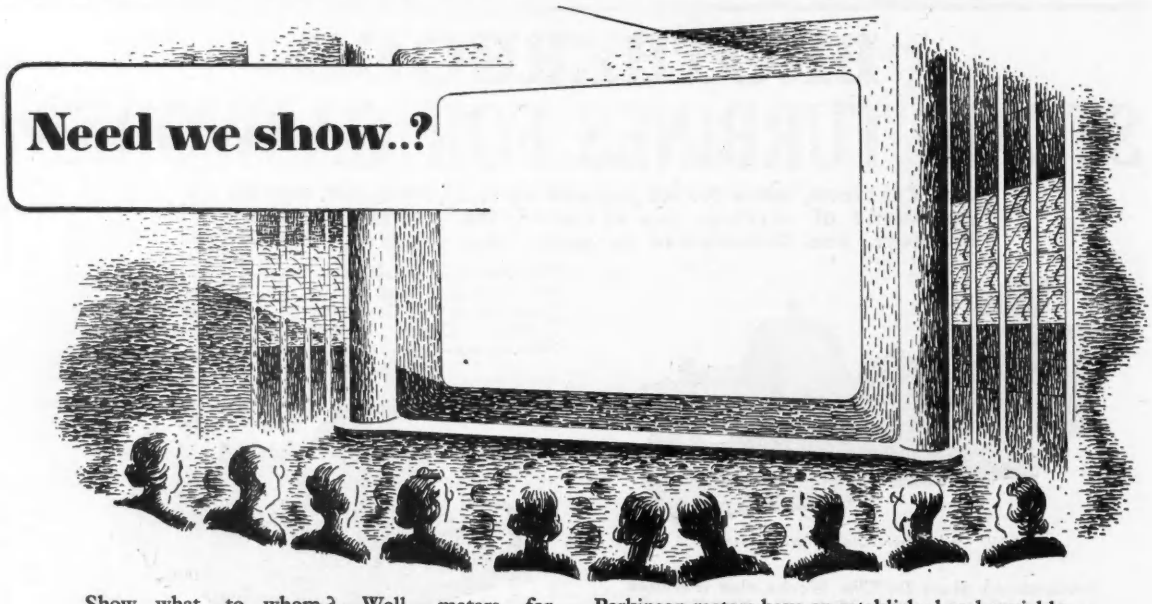

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GAS JOURNAL, AUG. 16, 1944

VOL. 244 96th YEAR No. 4239

EDITORIAL NOTES

FUTURE COKE DEVELOPMENT

WE are glad to publish on later pages an important report of the General Committee of the National Federation of Gas Coke Associations on future coke development. Actually the report was compiled as a private document in November last, and in point of fact certain of the recommendations have already been implemented, and we now have a National Technical Committee covering gas coke production for the whole country. Again, the District Coke Associations have in some instances already formed their local Technical Committees, and as this movement is proceeding apace it ought not to be long before every District Association has such a committee in being. It is obvious that a great deal of work has had to be done as a background to the report, and the National Federation is to be commended on a common-sense, practical, and highly constructive set of proposals—all the more encouraging, of course, in that action is being taken on them. There is real promise of the better marketing of our solid smokeless fuel.

We think that in the post-war period there will be a greater potential demand, particularly in the domestic market, for suitable smokeless fuels. Before the war the public and public authorities were becoming alive to the desirability of reducing atmospheric pollution and of securing a higher standard of convenience and cleanliness in their fuel services. During the war they have become appreciably more "fuel conscious"; there is a growing desire to use smokeless fuels—and gas coke forms 66% of the total tonnage of solid smokeless fuel consumed in the domestic and general industrial markets. To maintain this status of major producer, organization for service is a *sine qua non*. Implementation of the recommendations contained in the report implies the spending of money—a not inconsiderable charge against coke revenues. But the cost to provide for expansion on the lines envisaged is insignificant in comparison with the loss resulting from under-consumption and indiscriminate price-cutting. If each undertaking were to adopt, as regards coke sales, a similar policy to that adopted in connexion with gas sales, the results, we feel certain, would fully justify the expenditure entailed.

The report is an orderly statement, and all who study it will, we suggest, be impressed with the work which has gone before, and which, indeed, has made such a set of straightforward recommendations possible. These recommendations, covering technical and commercial functions, liaison between the solid smokeless fuel industries, the *raison d'être* of District Coke Associations, and advertising and propaganda, are there for everybody to read and analyze for himself, and there are only a few points we should like to mention by way of emphasis. Though we have not until now been permitted to give the report air, we have had it since its compilation at the end of 1943, have thus had plenty of opportunity for criticizing it and discussing it *in camera*—and for once we find ourselves both in entire agreement with the findings and more than usually hopeful of the practical outcome of these findings. Example, we think, will follow example, in practice, and that is what matters.

First let us look for a moment at the question of the fixing of coke prices. The report's dictum is that the starting-point should be the consumer's price delivered to his premises. From that should be deducted a merchants' margin, which would give the merchants' buying price at the local gas-works and at station. Then there is local cartage rate, which would leave an *ex* works and *ex* station price, which prices should in general be the same. And it follows that all gas undertakings should agree to sell at schedule prices, and where coke is railed to sell at destination prices. This is a reversal of the present procedure in some areas, where the starting price is the gas-works price, to which railway rate is added to obtain destination station price. The snag about the latter system is that the resulting price varies as between one gas undertaking's coke and another's. It boils down to averaging coke sales and not comparing individual sales. Interlinked is the angle of the distribution, and a district coke association cannot function fully without a satisfactory arrangement with its distributors—experience has taught this. Distributors should be regarded, not as competitors of gas undertakings, but as additional salesmen for gas coke; and of course they will want a reasonable "rake-off." They are in business for the sale of fuel, and naturally they will concentrate on those fuels which give them the best and most stable return. Also there ought to be co-operation between the District Associations themselves on price matters. It stands out a mile that there should be mutual agreement between associations to the effect that any one association will respect another's prices when selling outside its own area. This should be a guiding principle, and given the will it can be put into working effect to all-round advantage.

Concerning research and development, the recommendations are clear-cut, and we endorse the view that research work on the production of coke, being so closely related to research work on the production of gas, should be the function of the Gas Research Board, though *en passant* (*vide* "JOURNAL" of May 31) we recall our disappointment that the Director of the Board, in his recent review of progress, left the subject of coke—apart from a reference to its use for producer-gas driven vehicles—severely alone. The development of coke utilization is, however, a different problem, and one having an intimate bearing on coke marketing. Already a background of goodwill has been established with the appliance manufacturers; we have, for example, seen the improvement of the small domestic boiler and development of the gravity feed boiler, and as the co-operation increases so will the need for technical initiative grow. The report suggests with good foundation that it may become necessary to set up a laboratory properly equipped and staffed to design and to test coke-burning equipment and appliances, to examine new inventions and processes, and to have a display centre where potential consumers could be invited to see the latest coke apparatus and designs.

Then there is the question of "two-fuel mindedness." Gas and coke service personnel of gas undertakings should be trained so that each is alive to the respective uses of the two fuels, and is encouraged to see that each is appropriately placed. Where this has been tried it has been found to work in practice and to help gas sales, discounting entirely the idea that if coke were too freely developed it would retard the sale of gas. And the staffs of district coke associations should be encouraged to think of the Gas Industry as a whole, with gas and coke as complementary.

BOILER WATER TREATMENT

IN the interests of fuel economy and life of boiler plant all will agree, we think, with the importance of looking after the type of water allowed to enter the boiler instead of treating the matter rather casually, shutting one's eyes, as it were, and hoping for the best. For on such hopes the best will not mature. During the past six months or so we have had two full Papers on the subject—one by Mr. K. R. Mortimer, of March (see "JOURNAL" of Nov. 24 and Dec. 1, 1943), and the other, more latterly, by Mr. R. P. Donnelly, of the Gas Light and Coke Company. We have had occasion before to refer to the first-named contribution on this question of increasing the efficiency of steam-raising, and we would call attention now to Mr. Donnelly's Paper ("JOURNAL" of July 26 and Aug. 2). Students of the

subject have in these Papers excellent references, and we advise that they should be jotted down. We can imagine any number of examination successes ensuing from the taking to mind of these two comprehensive treatises, and compilers of text-books would find them very useful. What do you know about the new base exchange materials, or the organolites, of de-aeration, of de-oiling? And the answer? *Vide* Mortimer and Donnelly. We do not know to what extent in the Gas Industry, in individual gas-works, practice follows theory on boiler water treatment. Maybe there is a lag between the two in the tidal flow towards the steam-raising plant. The two contributions which we mention are perhaps all the more important because of this lag, which discussions on both seemed to indicate does in fact exist.

Continuity of Service and Contact

Barton-on-Humber has quite a small population and its "closing day" is on a Thursday. The district is served by a Gas Company which, since its formation, has adhered faithfully to the motto, "Gas does not let Barton down." There have been two occasions in the past, we believe, when the town was temporarily in darkness. We are talking, of course, of pre-blackout days. One was when the Humber overflowed—and one can hardly blame the Company for that—and the other was when a fire broke out on one of the very rare moments when, owing to illness, the Engineer and Manager, Mr. Richard Doughty, was unable to be in his office. We do not know whether it was on a Thursday, but Mr. Doughty, as will be seen under "Personal," has retired from active service with the Company as Engineer and Manager after 42 years in that position. Actually he has been with the Company for 73 years, for he joined it when he was 10 years old. So now, at the age of 83, he goes into well-earned retirement. We congratulate him and wish him well. But that is not all. Before him his father was Manager of the Company for 40 years. Whether it be the winds from the North Sea or the healthy "fumes" from the gas-works, or a combination of the two, which has accounted at any rate partially for this record of service of the two Doughtys, father and son, we do not know; but all will agree that it is a fine enough record. And we have heard so much of the value of personal contact between gas manager and consumer that no doubt the contact between the Doughtys and the inhabitants of Barton has been throughout to the Company's benefit. For getting on for a century dwellers in Barton, if ever in difficulty with the gas supply, would not have to write to *John Bull* about it, but ask Mr. Doughty.

Personal

Aged 83, and having served the Barton (Lincs) Gas Company for 73 years, Mr. RICHARD DOUGHTY, Engineer and Manager, has retired. His father was Manager of the Gas Company for 40 years and he himself has held the position for 42 years.

* * *

Mr. RICHARD KNIGHT has been appointed a Director of Stoves, Ltd. He joined the Company in 1920 as Chief Northern Representative, and for the past 12 years has filled the office of Sales Manager.

Obituary

Thomas Percy Ridley—An Appreciation

In the passing of my old friend and colleague for over 17 years I should like to pay my tribute to his memory, as my association with him in connexion with the Newcastle-upon-Tyne and Gateshead Gas Company was most pleasurable.

Entering the service of the Company at a very early age, he steadily rose to become the confidential assistant to the late Mr. Thomas Waddom, and on the latter's retirement he succeeded to the position of Secretary and Commercial Manager, where he at once displayed his energy and ability in embarking upon various schemes which placed the Company right in the forefront for enterprise and development of sound business.

He was a man of outstanding administrative ability, and the results of the arduous duties that he undertook for so many years in solving various problems that were constantly arising bear testimony to his versatile knowledge.

Few better witnesses have appeared before Parliamentary Committees, as he gave his evidence in such a lucid manner, which went to prove that he was completely master of the subject under consideration.

On the subject of gas tariffs alone his knowledge and experience was quite unrivalled, and he was always willing to render material help to his many associates who had this matter before them.

The Directors of the Newcastle Gas Company have lost a most able colleague, and one in whose sound judgment they had the greatest confidence.

He was an excellent host, and nothing pleased him better than to entertain the many friends in the profession who visited Newcastle and district.

He was actively associated with various societies in the North of England and was a zealous churchman. His second wife was a daughter of the late Canon Little, Rector of Whickham. He leaves a widow, a married daughter and a son, who is a Sub-Lieutenant in the Royal Navy, to mourn his passing. FRANK P. TARRATT.

Letters to the Editor

Post-War Training Plan

DEAR SIR,—Men on service, and their relatives on the home front, may well be reassured by the widespread response which has come from British industry to my recent offer in the "GAS JOURNAL" to share with other organizations the experience to date of the Dunlop post-war training plan.

The enormous interest aroused by the plan is a welcome recognition of the debt we owe to our men in the Forces. More than one hundred inquiries have come to me, at least two-thirds of them from such industries as the coal, iron, steel, textile, rubber, motor, engineering, gas, oil, electrical, flour, cable, plastics, hosiery, linoleum, needle, pharmaceutical, film, and boot and shoe; not to mention one of the big chain stores.

Our industrial organizations are indeed preparing to take up the challenge, as Lord Woolton declared to the House of Lords they would, to rebuild in this country a land worthy of its men. It will be good that the men themselves should know that preparations to receive them back into civil life are already well forward.

Meanwhile, from the long-term point of view, training of both staff and operative personnel, such as cannot be given elsewhere, has already begun, so opening up the way of advancement to the individual and increasing the efficiency of the industry. It would be difficult to rate too highly for the strenuous years of peace the cumulative value of this aspect of our work. Pursued in every industry it will do much to secure Britain's place in the markets of the world.

Fort Dunlop,
Erdington, Birmingham 24.
Aug. 8, 1944.

Yours faithfully,
C. D. LAW,
Chief Staff Training and Appointments Officer.

The Salaries Problem

DEAR SIR,—In spite of repeated remarks by senior members of the profession to the effect that the Industry must pay better salaries if it is to attract the right type of recruit, one still sees advertisements offering utterly ridiculous salaries. Recently an undertaking making over 600 million per annum advertised for a Technical Assistant and Chemist at the princely salary of £249 per annum. Do senior executives and/or their committees seriously expect to receive replies to such advertisements when they are paying their stokers—who in many cases were, until recently, unskilled labourers—£300 to £350 per annum?

It is high time junior members of the profession—if the seniors will not see the light—united to take serious action in this connexion. Plenty of hot air has been ventilated on the subject, and it seems best to bear in mind the adage that "action speaks louder than words."

I suggest that the Junior Associations should immediately consider incorporating the regulation of salaries in their articles and set about obtaining affiliation with the T.U.C. To those who doubt the wisdom of this course I would cite the case of the Scottish Bankers' Association, who by affiliation with that body was able to force the conservative banks to pay more adequate salaries to its members.

Junior members of this great industry, apart altogether from personal gain, ought to have as much interest in attracting the right type of recruit as the seniors; the pupils of to-day will become their assistants to-morrow.

Corporation Gas-Works,
Manse Place, Inverness.
August 10, 1944.

Yours faithfully,
DOUGLAS W. DAVISON,
Assistant Engineer and Manager.

National Federation of Gas Coke Associations

The National Technical Committee covering gas coke production for the whole country has had its first meeting. The members are:

Lancashire Coke Association: R. L. Greaves, H. H. Thomas.
London and Counties Coke Association: Dr. F. J. Eaton, W. Grogono.
Midland Counties Coke Association: T. F. E. Rhead, A. E. West.
North of England Coke Association: F. L. Scaife.
Scottish Coke Association: W. Nicol Baird, S. G. Melville.
South Wales Coke Association: W. R. Branson, W. T. Kenshole.
Yorkshire Gas Coke Association: W. I. Ineson.

Primitiva Gas Appeal

The Primitiva Gas Company of Buenos Aires, Limited, won the second round in its lawsuit with the Argentine Government on Aug. 4, when the Federal Court of Appeal reversed the decision of the lower court, which had granted to the Government immediate possession of the Company's property against the payment of 3,758,740 pesos, equivalent to about £230,000. The Appeal Court found that the Government had not proved that their claim for possession was urgent or that the price offered was reasonable. The judgment declared that the State technicians should have provided proofs that the offer was reasonable in view of the great disparity between the Company's claim and the Government's offer.

Removing Organic Sulphur Compounds from Gases

Among recent patents is one granted to the Gas Research Board and Arthur Key (No. 561,679). It covers a process for removing organic sulphur compounds from gases produced by the gasification of carbonized fuel with steam and/or with air or oxygen, which comprises subjecting the gas to the action of a catalyst (chromium or an oxide or sulphide of chromium) to convert organic sulphur compounds into hydrogen sulphide and subsequently removing the hydrogen sulphide so produced, wherein the catalyst is carried on a support composed of active carbon. The conversion is conducted at a temperature lower than would be required if the catalyst were not carried on such a support.

It has been found, for example, that when a catalyst of the kind, and more especially a mixture of chromium or an oxide or sulphide of chromium and copper or an oxide of sulphide of copper, is carried on a support of active carbon, the conversion of organic sulphur compounds occurs very rapidly at temperatures as low as 250°–350°C.

The catalyst may be applied to the support by impregnating particles of active carbon of any desired size with a solution of a chromium compound capable of yielding on heating chromium or an oxide or sulphide thereof. The chromium compound, for example, chromic acid, may be used alone or together with another suitable metal compound, preferably a copper compound such as copper nitrate, capable of yielding on heating the metal or an oxide or sulphide thereof. The impregnated carbon particles are then heated in an atmosphere of an inert gas, such as nitrogen, to produce the metals, oxides, or sulphides, after which the catalytic material is ready for use.

The reaction may be carried out by heating a vessel charged with the catalytic material at a temperature of about 250°–350°C., and passing the gas containing organic sulphur compounds through the vessel, the gas being preheated to the same temperature as the vessel. It is preferable to remove the whole or the greater part of the hydrogen sulphide present in the gas before subjecting it to the action of the catalyst, and this is essential if the content of hydrogen sulphide is so high as to inhibit to an undesirable extent the conversion of organic sulphur compounds into hydrogen sulphide. The gas may be passed through the vessel at any desired rate up to 7,000 volumes of gas (measured at ordinary temperature) per hour per unit volume of space occupied by the catalytic material in the form of particles of $\frac{1}{16}$ to $\frac{1}{32}$ in. diameter. In this manner over 98% of the organic sulphur compounds contained in the gas can be converted into hydrogen sulphide, which may be removed in any known manner with or without previously cooling the gas.

If desired, the treated gas, after removal of the hydrogen sulphide produced, may be subjected to a second or even a third treatment in successive vessels charged with the catalytic mass, the hydrogen sulphide being removed after each treatment. By this repeated treatment the content of organic sulphur compounds can be so greatly reduced as to be almost undetectable by the most sensitive tests.

The following example illustrates the process: A catalytic material is prepared by mixing a quantity of active carbon particles of approximately $\frac{1}{16}$ in. diameter with a solution of copper nitrate and chromic acid containing a weight of crystalline copper nitrate equal to one-half the weight of the active carbon and a weight of chromic acid equal to one-quarter that of the active carbon. The mixture is evaporated to dryness, and the impregnated particles are then heated in nitrogen at a temperature of 500°C. in order to convert the metal compounds into the oxides. The resulting catalytic material is packed into a portion 10 in. long of a tube having an internal diameter of 2 in. The tube is then heated to 300°C., and water gas freed from hydrogen sulphide and preheated to the same temperature is passed through the catalytic material at a rate of 50 cu.ft. per hour. After removing the hydrogen sulphide produced, the content of organic sulphur compounds (calculated as sulphur) per 100 cu.ft. of gas is found to have been reduced from 15 grains to 0.2 grain. The resulting gas is subjected to two similar treatments in succession, but in each case with a smaller quantity of catalytic material and at a temperature of 250°C., the hydrogen sulphide produced being removed after each treatment. The final sulphur content in the gas is hardly detectable, and does not exceed about 0.002 grain per 100 cu.ft.

Coke and By-Products in U.S.A.

The total production of gas coke in the United States in 1943 amounted to 862,104 tons, valued at $6,745,791, according to the Bureau of Mines, United States Department of the Interior. Production decreased 30,448 tons compared with that in 1942. It included 364,745 tons from horizontal retorts and 497,359 tons from vertical retorts, semi-inclined retorts, and "miniature horizontal gas ovens." Although coke breeze is not separated from the large coke at many coal-gas plants, the amount produced at works actually separating breeze amounted to 123,192 tons, a decrease of 8,783 tons (6.7%) from the 1942 total.

The quantity of coal used in the manufacture of coke decreased 85,396 tons (5.6%) when compared with 1942 and totalled 1,436,216 tons. The average cost of the coal per ton delivered at coal gas plants was $6.18 in 1943. The combined annual coal carbonizing capacity of all retorts in existence was 1,964,156 tons. Of the 3,037 retorts in existence at the end of the year, 2,491 were in operation, and the rate of production for the year was 43.9% of the estimated rated capacity of the industry.

Most of the coke used by producers was for fuel in heating the retorts and for the manufacture of water gas in adjacent plants. Of the 394,937 tons used by producers, 200,570 tons (50.8%) were used for heating benches, 151,640 tons for the manufacture of water gas, 15,194 tons for the manufacture of producer gas, and 27,533 tons for other miscellaneous purposes, mostly for steam-raising. Ordinarily about half the annual coke output is sold for domestic heating, but the shortage of other solid fuels during 1943 resulted in an increase in sales to domestic consumers from 50.3% in 1942 to 60.2%. In 1943, sales of coke were 518,825 tons for domestic heating, 26,917 tons for water-gas manufacture, and 32,189 tons for miscellaneous industrial uses, compared with 449,220 tons, 21,398 tons, and 63,264 tons, in 1942.

The production of 19,848,868 gallons of crude tar indicated a recovery of 13.82 gallons per ton of coal carbonized. Massachusetts continued to be the leading producer of coke and supplied 26.3% of the total output of the United States. Next to Massachusetts, the ranking producing states in order of tonnages were Wisconsin, New York, Michigan, Pennsylvania, and North Carolina, which together supplied 43.9% of the total. Although production in the six ranking states declined in 1943 compared with 1942, owing principally to labour shortages and substitution of natural gas for coal gas, the strong demand for domestic coke compensated this loss in part, and output of these states declined only 3.9%.

Dividends

Commercial.—No announcement can be made in regard to dividends on the capital stocks of the Company.

Croydon.—Dividends for the half-year ended June 30 at the following rates per annum, less income tax: Preference stock 4%, maximum dividend stock 5%, sliding scale stock 6%.

East Surrey.—A dividend of 2½% actual on the Ordinary "B" stock for the half-year ended June 30, less income tax (same). Dividends on all classes of the Company's Preference Capital will be paid at full rates for the same period, less income tax.

Hawick.—4%, free of tax.

Lochgelly.—4%, less income tax.

South Metropolitan.—Interim dividends at the rates of 4% and 6% per annum on the 4% and 6% Preference Stocks respectively for the six months ended June 30. Consideration of a dividend on the Ordinary Stock has been deferred until the close of the financial year, when the results for the twelve months to Dec. 31 will be available.

Tottenham and District.—Ordinary Stock 2½% actual, in respect of the half-year ended June 30; 5% Preference Stock 2½% actual, in respect of the half-year ended June 30; 5½% Preference Stock 2¾% actual, in respect of the half-year ended June 30. All less income tax at 10s. in the £.

Watford and St. Albans.—Interim dividend of 2½% on the Ordinary Stock (the same), and full interim dividends on the Preference Stocks.

The Municipal Gas Undertakings in Fife are protesting at the action of Fife County Council in giving a "monopoly" to electricity in the servicing of the many feeding centres in Scotland for school-children to be set up throughout the county. The position was considered by the Dunfermline Gas Committee, in whose area three of the feeding centres are to be established. Disappointment was expressed that the Committee should have been "prevented from quoting for public business by the granting to the Fife Electric Power Company of a monopoly by a democratically constituted body such as the County Council." A meeting is to be held shortly of representatives of the gas concerns in the County to decide on their future action. In the meantime a report on the whole question has been submitted to the Ministry of Fuel and Power.

Economic Utilization of Coke Oven Gas*

By E. W. SMITH, C.B.E., D.Sc., F.R.I.C.

IN his Address, Dr. Smith said that the most important problem to be solved as between the Gas Industry and the coking industry was the economic utilization of surplus coke oven gas, and experience in the supply of coke oven gas to the Gas Industry had not been, in his view, as satisfactory as it might have been. There had been a constant shift in the scale of values of the products of the coking process. At one time the proceeds from the sale of coke alone were sufficient to make the process commercially profitable. And later, the introduction of by-product recovery plant created the period in which this industry reached its highest peak of prosperity. But the upward trend of coal prices and wages during recent years made it inevitable that the gas produced would have to be used to supplement the returns from the process.

Development during the last few years had been rightly, in his opinion, directed to the use of surplus coke oven gas in steelworks and to its supply to the Gas Industry. And, in a number of instances where coke ovens were integrated with steelworks, the whole of the coke oven gas was used as an integral part of the internal economy of the steel company. It was probable that at present about 12% of the gas sold by gas undertakings was coke oven gas.

Important Factors

There are a number of factors which render the co-ordination between coke ovens and gas undertakings not as simple as might be expected. Briefly these are:

(1) Gas undertakings are under the statutory obligation to supply purified gas of a declared calorific value as and when required by consumers. They have therefore to be prepared to meet a widely fluctuating demand. Thus, a moderate-sized undertaking, with an average daily demand in the winter period of 5 million cu.ft., may have a maximum demand on a single day in winter of 5,500,000 cu.ft. or more, while the average day's demand on a summer's day might be no more than 3 million cu.ft. On the other hand, coke oven plants operate normally at a much steadier load throughout the year, and the proposition which is most attractive to the producers of coke oven gas is one which allows of the disposal of the whole of the surplus gas in a reasonable constant quantity from day to day throughout the whole year.

(2) The peak-load gas, which in the foregoing example might be assumed to be the demand in excess of 3 million cu.ft. per day, costs more to produce, due to the capital charges on the extra plant required to meet it, the fuel consumption required to keep retorts standing or working at a low throughput, and the extra wear and tear due to fluctuations in output. Hence, a constant supply of coke oven gas can replace only the base load gas—the cheapest for the gas-works itself to manufacture.

Price Economy

(3) A gas undertaking, in addition to providing the peak load gas, may have to purify and dilute the coke oven gas to the declared calorific value, and also to provide additional storage. An economic price for coke oven gas must therefore allow an appreciable margin to cover the costs.

(4) Provision has to be made of plant to discharge the statutory obligation to maintain supplies, as, for example, when part of the coking plant has to be let down for repairs.

The effective co-ordination of a gas-works and coking plant also raises the question of the type of oven and the method of underfiring, the type and method adopted depending very largely on the relative values of coke and coke oven gas.

It has been estimated that, when using producer-gas with the price of coke varying from 15s. to 40s. per ton, coke oven gas must be sold at the following prices, after deducting the cost of transmission:

Coke charged to producer plant per ton	15s.	30s.	40s.
Net value of gas per 1,000 cu.ft.	9d. to 9½d.	13½d. to 14d.	17d. to 17½d.

The preponderating influence of the price of coke on the cost of producer-gas for the heating of the ovens is also interesting. With coke at 15s. per ton it contributes about 65%, and at 40s. per ton about 80% of the cost of its production.

Producer-gas plant may be operated, of course, to balance the seasonal demands of the gas undertaking for coke oven gas, but, when this is done, the capital charges of the producer plant become more important. For example, if the output of the plant throughout the year was equivalent to only half its rated capacity, the values for the coke oven gas given in the foregoing table would require to be increased by 1d. to 1½d. per 1,000 cu.ft.

A problem which might therefore arise with an increased demand for coke oven gas would be whether to add producer plant at the coke ovens, assuming the ovens to be heated by producer gas, or to install additional carbonizing plant at the gas-works. In the first place, additional coke oven gas could be released by an expenditure on producers and fitments at a coking plant at a cost for equipment much less than that required for equivalent carbonizing plant at a gas-works. Further, whereas the release of this gas at the coking plant would involve no extra by-product plant, additional purification plant might be required at the gas-works.

Estimates show that if the increase in demand is an addition to the base load, it may be cheaper to produce at the gas-works, whereas if it is an addition to the peak load, it might well be that a coking plant, by installing additional producer gas plant, could release sufficient gas to meet the demand at a cheaper rate than the gas undertaking could manufacture it.

It is not usually practicable, even in the most favourable circumstances, to avoid passing on a reduced demand for gas to the coking plant. The first question which then arises is whether it would pay to install sufficient holder capacity at the coke ovens to store the gas which would otherwise be lost. The capital charges for gasholders work out at about 18d. per 1,000 cu.ft. of storage capacity per week. Hence, if the value of the gas so saved was 9d. per 1,000 cu.ft., it would be necessary to fill the holder at least twice each week with gas, which otherwise would be lost, in order to cover these charges. No general case can be therefore made out for gas storage to cover week-end working.

Lay-out of Plant

Fluctuations in the demand can be, however, taken up to a certain extent by the judicious lay-out of plant: for example, if a coke oven plant generates its own power, the steam requirements can be met by the following approximate quantities of alternative fuels:

	Required for steam raising.* Per ton of coal.	Available. Per ton of coal.
Breeze (½ in. to 0 in.)	116 lb.	45 lb.
Pitch	70 lb.	50 lb.
Coke oven gas	2,000 cu.ft.	6,000 cu.ft.

* These figures represent maximum loads when coal-handling plant is in operation. The load is substantially lower during the night.

These figures indicate a possibility of using coke oven gas for steam raising when the boiler plant is equipped with means for alternative firing.

Taking the value of breeze at 10s. per ton, the following approximate equivalent values of the alternative fuels are:

Breeze	10s. per ton.
Slacks	10s. to 11s. per ton.
Pitch	16s. to 17s. per ton.
Coke-oven gas	3d. to 3.25d. per 1,000 cu.ft.

On this scale breeze is the cheapest fuel to use, with probably slacks as the next most economical fuel with which to make up a deficiency. Pitch prices are generally considerably in excess of this equivalent value, and in general pitch could not be economically used. These figures also indicate that when surplus gas can be sold to a gas undertaking, it does not pay to use it for steam raising, except at times of minimum demand as at week-ends. The tactical use of coke oven gas in this way, assuming that all the breeze made was still used on the boilers, would enable the surplus gas to be reduced from about 6,000 to 4,750 cu.ft. per ton for such periods.

Modern Technical Developments

The development in this country of the use of coke oven gas from merchant coking plant has been directed mainly to its supply to the Gas Industry. There are three reasons for this. First, the market was already established and was therefore subject only to ordinary commercial risks; secondly, the capital involved (mainly gas mains and compressors) per unit of gas sold was relatively low; and, thirdly, the net return to the coking plant was in general higher than any alternative use could offer. Nevertheless, modern technical developments have shown that coke oven gas, with or without the additional use of coke, can, when suitably treated, be converted into a large number of important chemical substances for which there is a large actual or potential demand. One of these is the Fischer-Tropsch process of synthetic oil production. It might, therefore, be useful to consider some of the practical implications of this process from the coke-oven point of view.

The Fischer-Tropsch process requires a synthesis gas containing a ratio of hydrogen to carbon monoxide of 2 to 1. There are two main processes by which this mixture can be produced. First, coke can be converted into water gas, in which the hydrogen-carbon monoxide ratio is about 1.2 to 1, and then a suitable proportion of water-gas can be treated with steam, the carbon monoxide being

* An Address at a joint meeting of the Coke Oven Managers' Association and the South Wales Section of the Institute of Fuel. The Chair was taken by Mr. David Thickens (Chairman of the South Wales Coke Oven Managers' Association).

replaced by hydrogen, and the carbon dioxide, which is simultaneously formed, removed. This yields almost pure hydrogen which, when added to the untreated water gas, gives a synthesis gas having the required hydrogen-carbon monoxide ratio. Alternatively, coke oven gas, in which the hydrogen-carbon monoxide ratio is at least 5 to 1, may be passed through a water-gas generator to crack the hydrocarbons and producer-gas with the required ratio of hydrogen to carbon monoxide.

It has been calculated that when using coke alone for the production of synthesis gas, the amount of coke required by the minimum size of Fischer-Tropsch plant would be about 370 tons per day. This is roughly the output of a 500 to 530 tons (dry coal) per day coke oven plant.

If, however, coke oven gas and coke were used to produce the synthesis gas, a coking plant of about 650 tons (dry coal) per day capacity would be involved, assuming that the fullest use were made of the residual gas from the Fischer-Tropsch process to fire the ovens. There would be no gas for sale other than to the Fischer plant, and there would be rather less than half the total coke available for sale through the normal channels. From these facts, the question may be asked as to whether the Fischer-Tropsch process really holds out any prospect of becoming an outlet for surplus coke, either from a single plant, or from co-operative enterprise.

The answers depend finally on a number of considerations, which are not all technical in character. These are:

(1) To produce about 25,000 tons of primary products per annum (the smallest economic unit) requires an expenditure, on a pre-war basis, of the order of £1,250,000 for the Fischer-Tropsch conversion plant, including the synthesis gas and purification plant.

(2) The primary products require additional treatment to make them suitable for the most remunerative markets, and many important problems connected with the commercial disposal of the products have yet to be solved.

(3) Such a plant would provide a steady outlet for, at the most, 370 tons of coke per day, or, at the other end of the scale, about 270 tons of coke per day, together with about 6,000,000 cu.ft. of coke oven gas.

(4) The Fischer-Tropsch process was expensive to run in competition with natural products. Under pre-war conditions exploitation of the process could be contemplated only on the basis of the continuance of the full preference on home-produced fuel for a period which would cover the life of the plant. But, even under these conditions, it is unlikely that it would be possible to pay more than 6d. per 1,000 cu.ft. for coke oven gas and £1 per ton for coke.

Post-war conditions might alter the picture to some extent since the costs of the natural products may be higher, or Government policy may be specifically directed to the encouragement of home-produced fuels. Up to the present, however, there had been little inducement for the taking up of the Fischer-Tropsch process as an ordinary commercial venture, and therefore its bearing on the future disposal of coke and gas from the coking industry was not clear.

While these considerations may appear to present a somewhat reserved view of the possibilities of developing the Fischer-Tropsch process, there is some weight in the contention that one plant, if not more, should be constructed in this country. This was necessary in order that the technique of synthetic oil production should prosper in this country, and to develop the working up of the crude products from the Fischer-Tropsch process, as these were sulphur-free and contained a smaller number of hydrocarbons than natural oils. It was not difficult, by treatment of these products, to visualize the production of many useful chemical substances which, in the long run, might offer a greater return than the production of motor fuel and lubricating oils.

A Gas Grid for South Wales

It was not out of place, in view of the happenings of the last few months, to advance the view that there should be a grid for the supply of gas created in South Wales, and that its development should not be made dependent solely upon private enterprise. It should be the result of a thoroughgoing independent inquiry, and be finally under the control of a Board which was not merely profit-seeking. It would, of course, have to pay interest on the capital involved, but it should be concerned primarily to collect and sell gas for, and in the interest of, public welfare in South Wales.

The grouping of small undertakings, so that every undertaking could give a first-class service to the community, was also a sound development. These groupings could be effected by holding companies or joint boards. Either would do, provided they were properly regulated. But this aspect of post-war planning should not be allowed to interfere in any way with the question of a gas grid for South Wales.

DISCUSSION

Mr. W. Clark Jackson said the use of coke oven gas and the question of a gas grid for South Wales was under discussion by a post-war planning committee. There was a conviction that if South Wales was to prosper in the post-war years, one of the essentials was an adequate supply of gas at commercial prices, particularly for the light industries, as these were few in number, and it was hoped they would be greatly extended in the post-war world. There was a definite need for co-ordination between the coke oven industry and the Gas Industry, and between the smaller gas undertakings themselves.

Mr. John Roberts said there was a feeling in certain quarters in the Gas Industry that there was a great future for the use of coke oven gas for domestic purposes. It would be well, therefore, for the gas and the coke oven industries to draw closer together. Coke oven gas was very good and was consistent in quality. This could not be said for the gas produced by very small gas-works, which were usually very inefficient. Coke ovens were highly efficient. He supposed the thermal efficiency was of the order of 80 to 90%; certainly 80%, whereas the very small gas-works, most of which should be closed down, had efficiencies of the order about 60 to 65%.

Mr. J. B. Deakin said that the works with which he was associated had got over the trouble of constant production of coke with a varying demand for gas by having a boiler plant in which blast-furnace gas, coke oven gas, or coke could be burned. This was a very practical and efficient way of solving this problem with a combined coke oven plant and steelworks. The problem of adapting a merchant coking plant to meet the varying demand of public utility distributors, however, was not so easily solved. The obvious way was to provide adequate storage, but this was not usually a practical proposition.

Major E. Ivor David said that during the war the use of gas for industrial purposes and processes had been developed to a degree that was never thought of a few years ago. In the tinplate industry it had been developed and utilized to an amazing degree, and one effect had been to improve the efficiency of many of the processes. The efficiency of gas production had been investigated to a greater extent than ever before, and there was now more accurate knowledge of the efficiencies of gas undertakings. Unfortunately, the inefficient undertakings were very often in the remote districts. The South Wales area was ideal for a gas grid, and if one were to be established it was to be hoped that it would take in the areas of supply of the small and inefficient undertakings, however remote they might be from the main centres of population.

Mr. R. J. Auckland said he was the Chairman of the Post-War Planning Committee for the Gas Industry in South Wales, and it was true to say that there was not sufficient coke oven gas in South Wales to supply a gas grid adequately. His Committee was investigating the possibility of taking the quantities of coke oven gas which were available, and at the same time they were examining the possibility of increasing the supply of gas for industrial purposes. There could be no doubt that a gas grid was a project of the utmost importance to South Wales gas undertakings.

Mr. J. H. Canning said he hoped Dr. Smith's Address would arouse an active interest in the question of a grid for the supply of gas in South Wales. The starting-point was the bringing together of the Gas Industry and the coke oven industry, so that the project could be discussed on a friendly basis by all the interests concerned.

Professor W. R. D. Jones asked if the introduction of a gas grid would ensure a supply of gas of more constant calorific value and pressure, with a more constant percentage of water vapour, and less variation in sulphur content in South Wales. The reason for his question was that, since the war, many light fabrication industries had been dispersed into the area. Some drew gas supplies from small works. He had had some experience with and knowledge of some of the newcomers, and one of their bitterest complaints in using gas was that they had had troubles due to the great variation in these properties of the gas supplied compared with Sheffield and Birmingham.

Dr. Smith, in reply, said he did not see why there should be this difference between South Wales and other districts. He could only attribute the complaints to the effect of wartime conditions on gas production.

Diary

Sept. 1.—B.G.F. Domestic Heat Services Committee: Gas Industry House, 2.30 p.m.

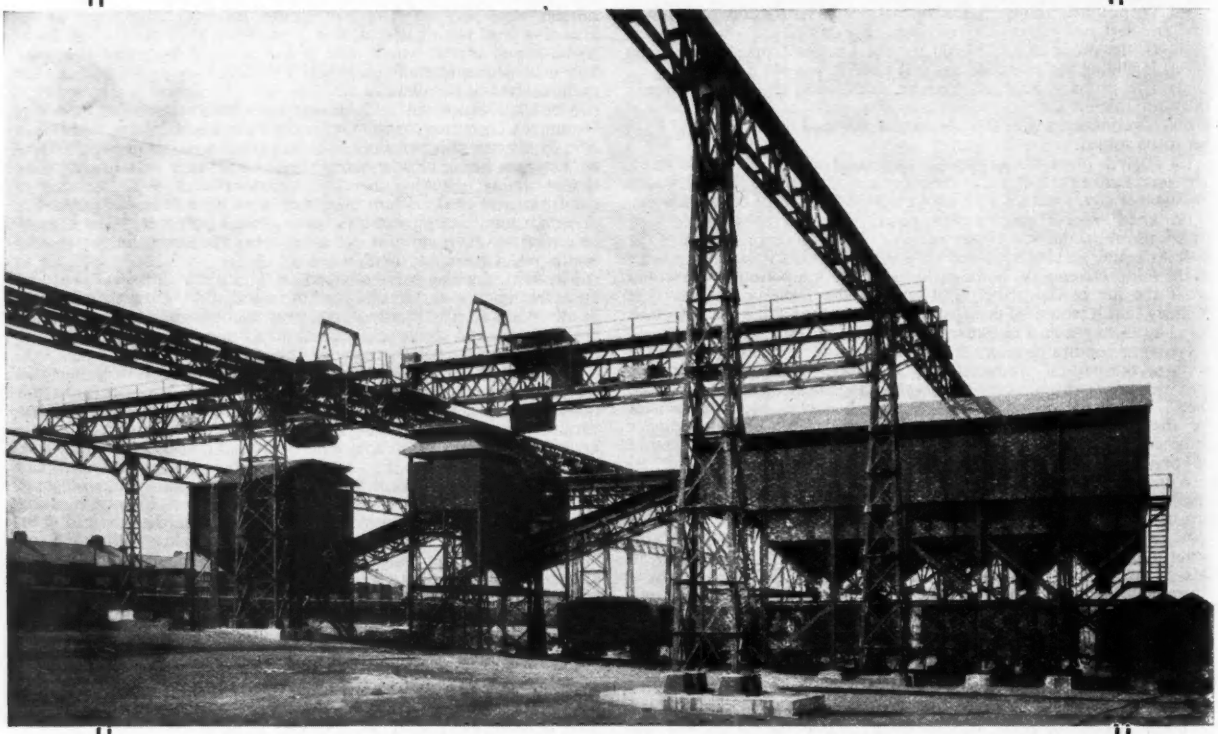
Sept. 8.—North British Association of Gas Managers: Annual Meeting, Edinburgh.

Alderman A. E. Hewitt, M.C., J.P., Chairman of the Stoke-on-Trent Gas Committee, in submitting the results of the working of the Stoke-on-Trent Gas Undertaking for the year to March 31, 1944, referred to the satisfactory results which had been obtained during the year, and emphasized that although the cost of coal and wages had increased, and the prices of all materials connected with the manufacture of gas had shown tremendous percentage increases, the price of gas had only been increased by an amount varying between 0.32d. per therm and 0.84d. per therm for the various classes of consumers. He gave a warning, however, that if the price of coal showed further advancement, or should residuals not maintain their present levels, it would be necessary to increase the price of gas to compensate for any extra financial disbursements which the Department might have to make.

"Subject, therefore, to the Home Secretary's approval, we hope to ensure that as from Sept. 1 next there will be a greater amount of street lighting than is at present possible under the star-lighting schemes." This is an extract from a report by the Chesterfield Emergency Committee submitted to the General Purposes Committee of the Town Council. The report states: "There has been such a change in circumstances as in our opinion would justify some measure of street lighting during the forthcoming winter, and we therefore agree that as far as possible, having due regard to the available supplies of gas, materials, and labour, street lighting will be introduced in Chesterfield as from Sept. 1 next." The Gas Engineer and the Electrical Engineer are being instructed to prepare for such lighting.

MECHANICAL HANDLING PLANT

by Dempster OF ELLAND



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Future Coke Development

THE General Committee of the National Federation of Coke Associations has for some time had under review future development of the gas coke industry and, in particular, the organization of the National Federation of Gas Coke Associations and the District Coke Associations. These matters have received careful consideration, and a report just published sets out the findings of the Committee and its recommendations.

The Committee have made certain assumptions which are fundamental for the purposes of the report. These are: (*a*) That the Gas Industry will continue to produce coke for a considerable number of years to come. In support of this assumption the Committee calls attention to the views of Dr. E. V. Evans as outlined in his Presidential Address to The Institution of Gas Engineers on June 9, 1943, in which he stated: "The replacement of solid fuel will be slow and we would be foolish to expect any wholesale change from solid fuel towards the use of gas and electricity. At the same time we can ensure that so long as the public wishes to use solid fuel it can do so without the grosser disadvantages attached to its use. In so doing coke will prove a valuable ally to gas. Once again, we must see that we employ coke in such a way that its use will be most beneficial to the public, and that we do not advocate its use solely because we happen to have it available."

(*b*) That the capacity to produce coke, particularly in the coke oven industry, will be considerably greater after the war than before it.

The Committee believes that gas-works and coke ovens can make an important contribution to fuel conservation and generally to national economic and social welfare after the war, and on that account it feels justified in expecting that these industries will receive a large measure of recognition and encouragement in the post-war policies of those government departments which will influence the production and utilization of fuel.

If these expectations are realized there should be a steadily expanding market for gas, and in consequence the country's capacity to produce coke, already enlarged as a result of the war, will be greater rather than less.

(*c*) That some of the markets for coke which have been created by war conditions will cease to exist when the war ends.

The demand for coke during the war is to some extent artificial. There are a number of coke outlets which can reasonably be expected to diminish substantially when the war ends, such as Government service and emergency establishments. On the other hand, the war may not end suddenly, or alternatively the export market may for a time readily absorb coke which may be released by any diminution in home requirements, but sooner or later it is expected that the position will be reached when supplies exceed the demand.

(*d*) That there will be in the post-war period a greater potential demand, particularly in the domestic market, for suitable smokeless solid fuels.

The prospect of supply exceeding demand should not cause disquiet because of the great potential in the expansion of the inland market for coke. There is a considerable body of evidence to suggest that even before the war the public and public authorities were becoming alive to the desirability of reducing atmospheric pollution, and of securing a higher standard of convenience and cleanliness in their fuel services. There can be little doubt that during the war they have become appreciably more "fuel-conscious," and that there is a growing desire to use smokeless fuels if suitable fuels are available at a reasonable price.

It will be the task and duty of the carbonizing industries to provide such fuels, either gaseous or solid, according to the preference and needs of the consumers.

Conclusions from Basic Assumptions

From these basic assumptions it may be concluded that:

As a coke producer the Gas Industry will experience intensified competition for available markets, certainly with the other solid smokeless fuel industries and, in the absence of co-operative arrangements, between its own constituent parts.

Such competition would lead inevitably to undue price-cutting, which would have little effect in increasing total demand, and which would deprive the solid smokeless fuel industries of the funds necessary not only for their own prosperity, but for the research and organization required to provide the best service to the consumer and to the nation as a whole.

The solid smokeless fuel industries will be presented after the war with a greater opportunity for service in providing the means to secure a cleaner atmosphere and a better utilization of the country's fuel resources.

The gas coke industry can play its part only if it is organized and technically equipped to produce a fuel which is acceptable to the consumer, and to encourage the design and production of efficient fuel-burning apparatus.

What follows is mainly concerned with the structure and functions of the kind of co-operative organization which, in the opinion of the Committee, would best be suited to attain the objects suggested in the preceding paragraphs, namely:

The co-ordination and regulation of coke prices.

The study and development of existing and new markets for coke.

The provision of smokeless fuel, and the encouragement of the design and production of fuel-burning apparatus which will be acceptable to the consumer.

Generally to enable the gas coke industry to maintain its proper place in relation to the solid smokeless fuel industries in the post-war fuel economy of the country.

Before proceeding to details of the coke organization there are certain general observations which seem to be appropriate at this stage.

It is within the knowledge of the Committee that there are certain undertakings who produce gas coke of a quality which leaves a great deal to be desired. The Committee does not believe that any organization, however well conceived, can create and retain remunerative markets except on the basis of the best possible product. It feels, therefore, that the continued improvement of gas coke quality is fundamental to the complete success of the organization recommended.

The gas coke industry can only maintain its status as the major producer of solid smokeless fuel if its degree of organization and capacity for service are commensurate with its importance to the Gas Industry and to the community. It is interesting to note that gas coke forms 66% of the total tonnage of solid smokeless fuels consumed in the domestic and general industrial markets (other than blast furnaces and cupolas) compared with 22% hard coke and 12% anthracite.

It is fully realized that the cost of implementing the recommendations of this report would constitute a not inconsiderable charge against coke revenues and, moreover, it is probable that after the war coke prices will fall. The Committee has endeavoured to formulate proposals which, if given effect to, would prevent an excessive reaction from present price levels, and would provide for the necessary expansion of coke markets at a cost which is insignificant in comparison with the loss which past experience has shown to result from under-consumption and indiscriminate price-cutting. The Committee believes that if each undertaking were to adopt, as regards coke sales, a similar policy to that adopted in connexion with gas sales, the results would fully justify any expenditure entailed.

Functions of District Coke Associations

The main functions of District Coke Associations are defined by their respective "Constitutions" or "Agreements," but it has been the concern of the Committee to see how these functions and all they envisage can best be carried out, and to provide for such expansion as is deemed to be necessary to enable the Associations to fulfil an effective and requisite service to their members. For the purpose of the report these functions are described in more detail under two main headings—"Technical Functions" and "Commercial Functions."

Each District Coke Association should cover an area large enough to enable it to act independently and effectively, and the total membership of each such association should embrace a sufficient proportion of the tonnage produced within its district to enable it to exercise control. In order to ensure tenure and to enable long-term plans to be developed, the Associations should each have a term of agreement of not less than five years' duration.

It should be the duty of District Coke Associations to view the coke position of their District as a whole and of each member individually; and to put into practical effect the recommendations made nationally to enable the benefits of pooled experience to be fully enjoyed by each Association and by each member of it.

At the outset a survey of the position in each District should be made, so that detailed records could be compiled of all the circumstances surrounding the production and sale of coke by each member, and these should be kept up to date.

To enable all this, and the other work envisaged in the report, to be carried out, a full-time staff for each Association would be required, preferably operating independently of the control or environment of any single gas undertaking. The size of the staff would depend upon the tonnage controlled by each Association, but such control should embrace a large enough tonnage of coke to maintain at least a District Secretary, Technical Assistant, Coke Distributors' Branch Secretary, and an appropriate office staff.

If at first glance this appears to be ambitious, it should be borne in mind that the aim is to establish a co-ordinated and specialized marketing organization, which would be more effective and less costly than the unco-ordinated efforts of a large number of undertakings working independently.

Technical Functions.

It is considered that future coke marketing should be based on service to the consumer, requiring much more specialized and technical knowledge and more expenditure of time and energy than has hitherto been devoted to it. Coke should be presented to the public as an efficient manufactured fuel, not as a waste product. This is in contrast to the old-fashioned practice of taking orders at cut prices, paying little attention to the consumers' requirements.

In the first place attention should be paid to the design of the appliances for using coke. The aim should be for these to suit the fuel, to be up to date in appearance, convenient and efficient in performance, and yet available within a price range to suit all markets. It should be the responsibility of the gas coke industry, as the largest producers of solid smokeless domestic fuels, to take the initiative in appliance design and, when the desirable efficiencies had been established, to seek the co-operation of the appliance manufacturers for their introduction. A background of goodwill is already established with the majority of these manufacturers which, if developed nationally, could ensure an increased production of suitable appliances.

A precedent already exists to prove the value of co-operation between appliance manufacturers and a District Coke Association. The improvement of the small domestic boiler; the development of the gravity feed boiler, which in particular helped to meet competition with oil fuel before the war; and the Approved Appliance Catalogue, compiled in collaboration with the manufacturers, are instances of the benefits which can accrue from co-operation of this kind.

The second step would be to develop coke markets in every gas undertaking's area. These markets might be divided into two categories—namely, new buildings and existing buildings.

The development of the use of coke in new buildings should be the first consideration of gas undertakings seeking fresh outlets, because it presents a ready market and is the easiest problem. For new buildings there are two main approaches—namely, through the Ministry of Works and Planning and other official bodies, and through those responsible for the erection of buildings such as architects, heating and ventilating engineers, and builders.

The Federation has already done useful work with the Ministry of Works and Planning and is represented on a number of Post-War Planning Committees, but full advantage can be obtained only if each District follows up this work with local authorities and others responsible locally for post-war reconstruction. Even though the Ministry of Works and Planning went so far as to recommend that in new homes a boiler to use solid fuel should be installed in the kitchen and an open fire in the living room, they would not necessarily recommend any particular fuel.

Before the war there was a considerable tendency to regard oil as the modern fuel for commercial buildings, particularly for central heating, and possibly this tendency will be revived as soon as oil becomes more freely available. To combat this, specialized selling needs to be developed and coke presented as an efficient fuel for use in modern appliances, so that contact with those responsible for the erection of new buildings would be most essential.

In the past the activities of local contractors and speculative builders have presented many problems because usually their object was to supply the cheapest house regardless of the efficiency of the appliances installed. It is hoped that national legislation in the post-war period will correct this to some extent but, if not, the solution of this problem will depend largely upon local effort.

With regard to existing buildings, if sufficient coke were available to necessitate additional markets being found, it would become the function of the District Coke Association to deal locally with this phase of development. The way in which the Association could assist in this direction is dealt with later in the report.

It is anticipated that the gas coke industry would not wish to form a separate gas coke research organization, having regard particularly to the development of the Gas Research Board, and it is appreciated that as research work on the production of coke is so closely related to research work on the production of gas, this would naturally be the function of the Gas Research Board. The development of coke utilization, however, is a different problem, and one which has an intimate bearing on coke marketing. If the Federation is to negotiate with the appliance manufacturers and other technical bodies, as suggested above, the amount of utilization development would necessarily increase. Up to the present time the testing of appliances and other relative work has been carried out by a few gas undertakings, but it is thought that it would be unreasonable to expect them to bear this additional burden.

It is recommended, therefore, that in order to carry out specialized selling and to make contacts with the appliance manufacturers and heating engineers effective, it may be necessary at some future time to set up a laboratory properly equipped and staffed to design and to test coke-burning equipment and appliances; to examine new inventions and processes; and to have a display centre where potential consumers could be invited to see the latest coke apparatus and designs.

Presupposing that proper coke appliances have been made available and coke markets opened up, the question of suitable coke arises. The Committee desires to emphasize that coke quality and the maintenance of uniformity are matters of major importance on the premise that the requirements of the consumer are the governing factors both as to the kind of appliances to be installed and the kind of fuel to be used. While it is appreciated that coke has to be made from a variety of coals and is subject to varying methods of carbonization, it would appear to be possible to produce better quality coke and to maintain uniformity in quality without foregoing the most economic yield in the process of gas and coke manufacture.

Equally important is the question of sizing, because most of the modern appliances require a sized fuel. It is hoped, therefore, that this, too, will receive early attention in all Districts, and that the names and numbers of sized coke will be standardized nationally. The Federation has already adopted the "Report of the Committee on Coke Quality—Part I—Sizing of Coke," issued by The Institution of Gas Engineers on this matter. It appears to the Committee to be almost impossible to negotiate successfully with outside organizations for the sale of coke unless the descriptions of sizes or grades of coke are uniform everywhere.

Having taken into consideration all the foregoing factors, the Committee feel that certain definite steps should be taken to ensure that the technical aspects of coke marketing receive proper attention, and that facilities be provided for the accomplishment and co-ordination of the work outlined above in each District and nationally, and recommends the following:

(1) That each District Coke Association should form a Technical Committee with representatives drawn from its producer members.

(2) That each District Coke Association should employ at least one full-time technical adviser with commercial ability.

(3) That a National Technical Committee drawn from a certain number of representatives of the District Technical Committees should be formed as a sub-committee to the General Committee of the Federation.

(4) That there should be a Panel of Technical Experts attached to the National Technical Committee.

(1) *District Technical Committees.*—The functions of these would be to deal with technical coke problems arising within their areas and to direct the work of the technical adviser. The problems would relate to coke production and coke utilization and, in particular, to the practical application of the national policy to develop local markets. Each District Technical Committee should appoint at least one representative to the National Technical Committee.

(2) *District Technical Advisers.*—These Advisers would be on the staff of the District Coke Associations. They should have an all-round technical knowledge of production and utilization problems and be able to apply this commercially. Their main duty would be to act as liaison between potential consumers, the local gas undertakings and the District Coke Association, with the primary object of creating new local coke markets. In order to do this they would have to be familiar with the coke production and utilization problems of all gas undertaking members. Even gas undertakings having their own technical staff would often find it an advantage to have an independent man whom they could call in to give help and advice. It is anticipated that the justification for the employment of a technical adviser would soon be apparent, and that some District Coke Associations would even desire to increase their technical staff.

(3) *National Technical Committee.*—This would be drawn from the District Technical Committees. Its function would be to conduct all national negotiations of a technical nature to deal with matters of technical policy, and to co-ordinate the work of the Districts. It would delegate representatives to the Solid Smokeless Fuels Federation Technical Committee (further reference to which is made in the section entitled "Liaison with Solid Smokeless Fuel Industries").

(4) *Panel of Experts.*—This panel would be made up of specialists in each engineering branch—*e.g.*, coke-burning appliances, heating and ventilating engineering, steam raising, and agricultural work—would be attached to the Federation, and would work from a central point. The services of the Panel would be available to each District Coke Association as and when required to give expert advice on particular subjects. It is appreciated that in practice such a Panel would have to be built up over a period of time. Meanwhile, it is suggested that the London and Counties Coke Association might be asked to allow their Panel, which had been built up on similar lines before the war, to devote some of its time to the Federation's work, on the basis of *pro rata* payments by the District Coke Associations.

Commercial Functions.

It is considered that commercial marketing and the technical development of coke are interlinked but, in so far as they can be separated, the commercial side is covered by three main principles—namely:

The development of the sale of coke locally.

An economic price structure.

Arrangements with distributors.

The Development of the Sale of Coke Locally.—As already stated, one of the first aims of District Coke Associations should be to develop markets and to assist the sale of coke in the area in which it is produced. All gas undertakings should appreciate that coke is a commodity which has to be sold, and that it will require even more sales effort than some of its competitors because there are traditional prejudices against coke which will have to be broken down.

It is considered that each gas undertaking should have a designated coke salesman or, if the undertaking is large enough, a coke sales department, and should display coke and coke appliances in its showrooms. Gas and coke salesmen of all gas undertakings should be trained to be two-fuel minded, so that each is alive to the respective uses of the two fuels and is encouraged to see that each is appropriately placed. Where this has been tried it has been found to work in practice and to help gas sales, discounting entirely the idea that if coke were too freely developed it would retard the sale of gas. Similarly, the staffs of District Coke Associations should be encouraged to think of the Gas Industry as a whole, with gas and coke as complementary to each other.

REVISION OF PRICES

The increase in costs of manufacture of Gas Cooking and other appliances is such that adjustment of prices can no longer be postponed.

After reference to the Board of Trade Central Price Regulation Committee adjusted prices have been determined by reference to selling prices generally ruling at August, 1939, and represent an increase of 50 per cent. in the case of Cookers, etc., and 45 per cent. in the case of Fires and Space Heaters.

These revised prices will come into operation and will apply to all goods despatched on and after August 14th, 1944.

ARDEN HILL & CO. LTD.
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"OPERATED PERFECTLY

whereas nearly all other appliances were practically unusable....."

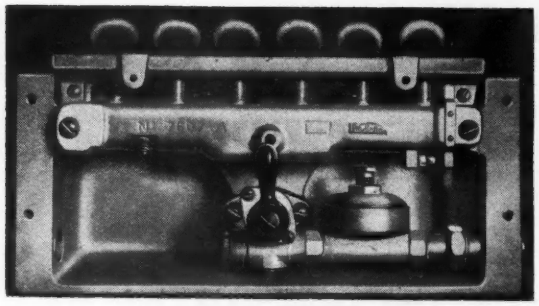
A Gas Engineer and Manager writes of the 'Silent Beam' in a recent issue of the 'Gas Times':

"DISTRICT PRESSURES

"Dear Sirs,—In your interesting article on Rome's Gas Supply in the 'Gas Times' of February 12, I note that distribution pressures are between the limits of 3.2 in. and 1–2 in. during the day load.

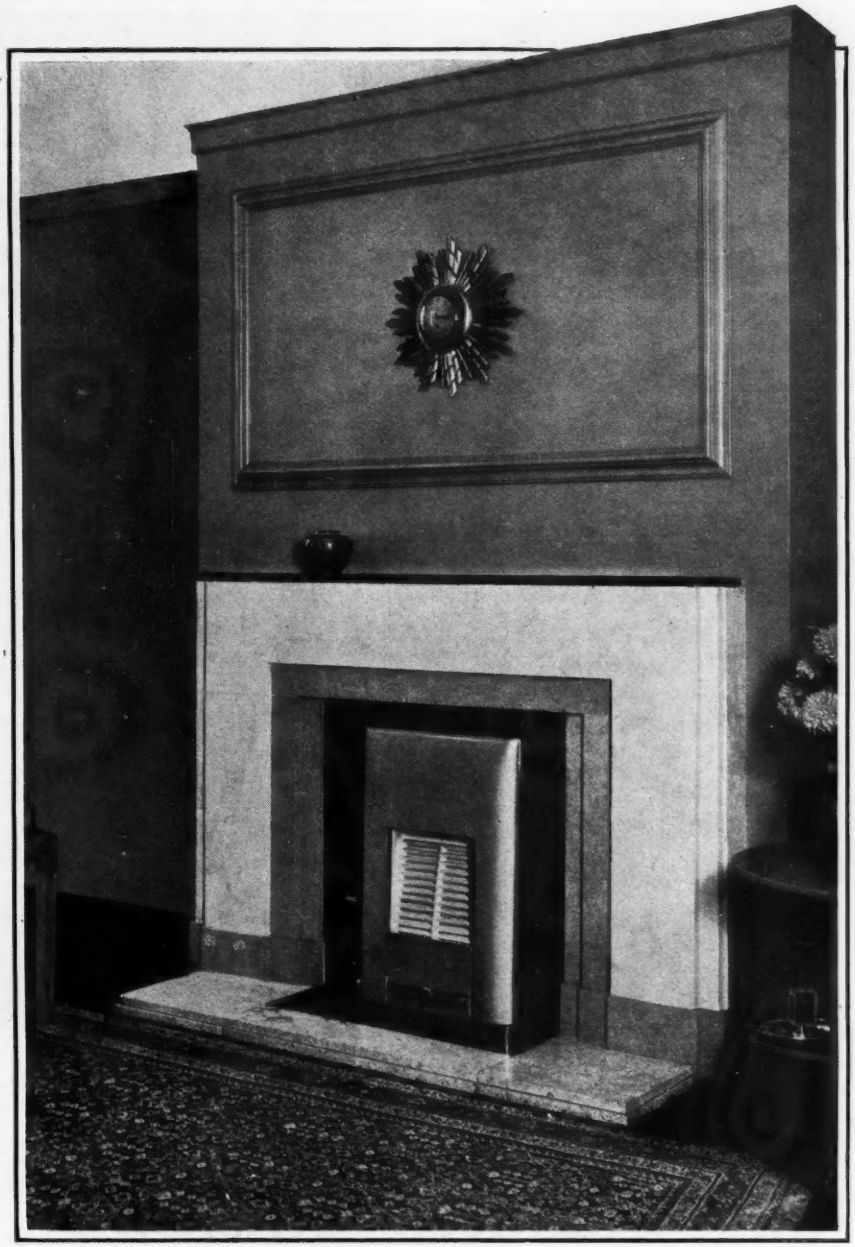
"It is interesting to note that recently we were obliged to reduce our district pressures to 2 in. for a short period, and it was observed that Radiation "Silent Beam" fire—which I believe is governed to work on 2 in. pressure with flat flame burners—operated perfectly, whereas nearly all other appliances were practically unusable. In view of the extended use of flat flame burners on cookers, etc., after the war, it would seem that appliances designed on these low pressures would be of great benefit to the distribution side of the industry, where the problem of fluctuating district pressures is almost as vital as the sulphur removal problem.

Yours faithfully, ENGINEER."



SILENT BEAM

Gas Fires



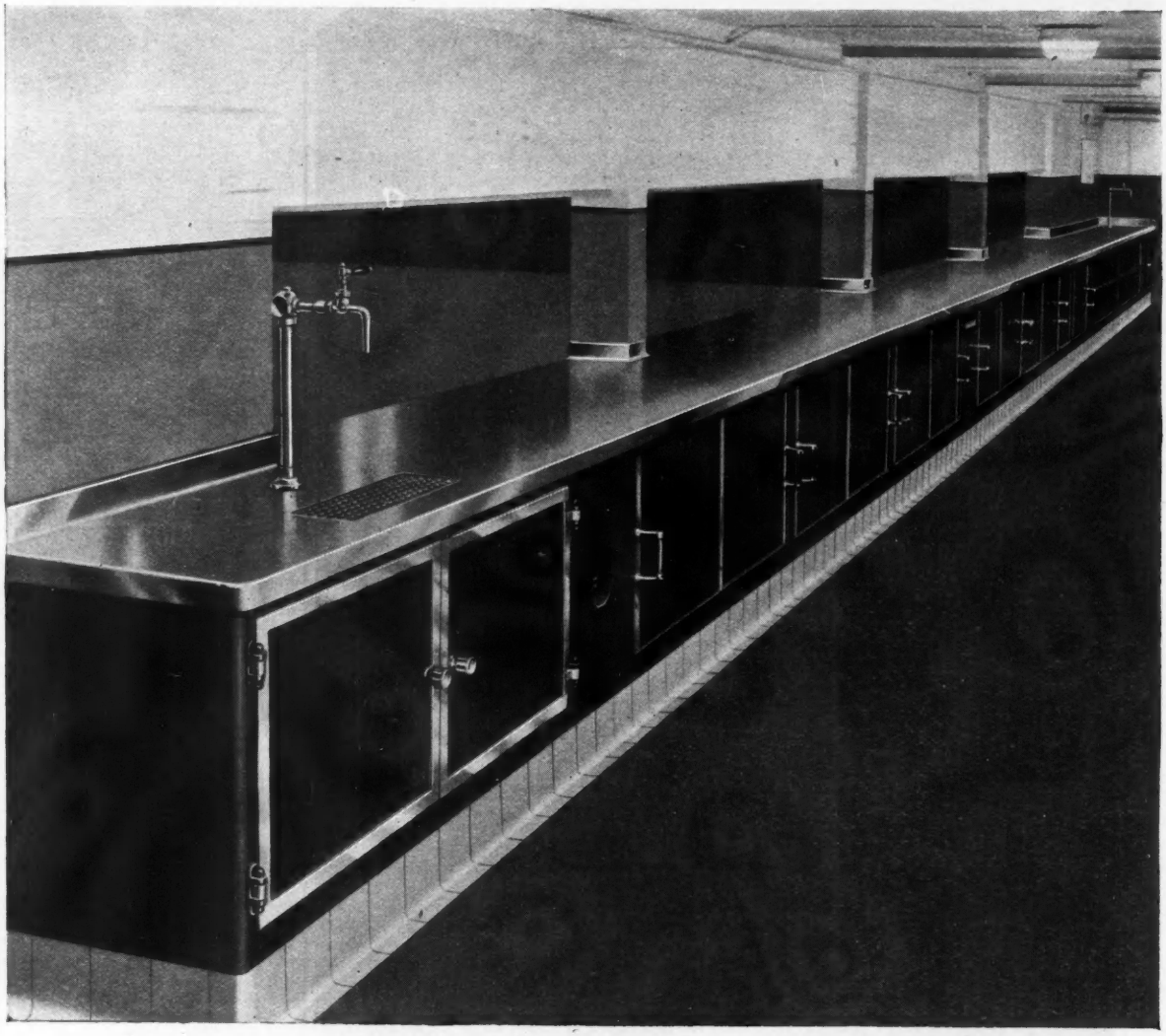
A Silent Beam Gas Fire fitted in the Radiation London Showrooms

Radiation Ltd.

RADIATION HOUSE, ASTON, BIRMINGHAM, 6

SHOWROOMS AND LONDON OFFICE:
7 STRATFORD PLACE, W. 1

LARGE-SCALE APPARATUS FOR THE COOKING AND SERVING OF FOOD



A view of the Women's Service of a large Canteen Kitchen equipped by

R. & A. MAIN LIMITED MAIN LONDON AND FALKIRK

If a minimum price structure were developed as detailed below, the question of price-cutting would be ruled out. Gas undertakings and distributors would all sell coke to the consumer at the same price. Therefore, everything would be centred around service to the consumer.

There are various methods of developing local markets. For instance, it is sometimes found that an undertaking's area of supply, if properly developed, could absorb a considerably greater tonnage of coke than is produced locally. Such a case would be known to the District Coke Association's Technical Adviser, and the local gas undertaking should be encouraged to develop that market. This could be done in several ways : the distributors could be encouraged to bring coke into the area from other undertakings having a production greater than their local demand; or the local gas undertaking could purchase the coke and re-sell it to local distributors. Alternatively, coke could be purchased by the local gas undertaking acting as a merchant re-selling to consumers. This would depend upon local conditions and the relative facilities of the gas undertaking and distributors in the neighbourhood. The greater the local market a gas undertaking develops, the greater safeguard it builds up for the sale of its own product.

Another gas undertaking might be in the position of having a large production within a comparatively small area, making it difficult for it to sell all its make locally at all times of the year. It would be one of the duties of the Technical Adviser to assist such an undertaking, through the District Coke Association, by giving notification of areas and/or consumers where this coke could be utilized.

Again the possibility cannot be altogether ruled out that there are undertakings at present railing coke to destinations outside their area without fully exploiting the potential markets in their own vicinity. From the initial survey of the District, the Technical Adviser should be able to detect such instances and to bring them to the notice of the gas undertaking concerned.

The exploration of new markets by the Central Panel of Experts, or by the District Technical Advisers, should also help in the promotion of local sales.

It is recommended that as and when possible each District Coke Association should consider setting up an internal pooling arrangement for the regulation of shortages and surpluses. Otherwise, it is sometimes difficult for surplus coke to reach the shortage areas at the proper destination price without undue loss of revenue to the exporting gas undertaking.

Another aid towards the development of local coke sales would be for gas undertakings' salesmen to form themselves into Coke Salesmen's Circles. This should be arranged under the auspices of the District Coke Association; meetings should be held regularly; a chairman elected annually from the Circle members; papers given and discussion encouraged. In this way it would be possible for the salesmen to keep in touch with the latest coke developments, to exchange views and experiences, and to raise difficulties or problems which required solution.

An Economic Price Structure.—The foundation stone of price regulation is, of course, the establishment and rigid maintenance by producers and distributors of minimum prices. The fixation of prices is a matter which should be worked out in close collaboration with distributors provided that the final decision rests with the District Coke Association. The Committee is convinced that coke markets cannot be built up on fluctuating prices to the consumer, and that an economic price structure demands that schedule prices shall be observed not only as minimum but as "actual" in practice. This means that producers should agree to sell at the prices scheduled, and that when coke is railed it should reach its destination at the schedule price ruling at that place, so that producers should always pay the railway rate to the destination. The schedule of prices should be strictly adhered to, no less by gas undertakings than by distributors, and disciplinary action taken if this is not done. The possibility of gas undertakings agreeing to honour minimum prices outside their own statutory area, but feeling they should have latitude within their own area, is considered unworkable.

Each District should have printed price schedules and, as the form now used by the London and Counties Coke Association, Midland Counties Coke Association, and Lancashire and District Coke Association has been found to be adequate in practice, it is suggested that it should be adopted by the other Districts so that there would be reasonable uniformity throughout the country.

The starting-point in the fixation of coke prices should be the consumer's price delivered to his premises, which should be related to the price of competitive fuels. From that should be deducted a fair and reasonable merchants' margin, which would give the merchants' buying price at the local gas-works and at station. From the same delivered price should be deducted the approximate local cartage rate which would leave an *ex* works and *ex* station price to consumers. In this way a merchant would buy coke at the local gas-works or imported coke at the station at the same price. The same conditions would apply to consumers. If prices were based on economic principles there could be no justification for a different price for coke taken at the gas-works as against coke taken at the station, unless the gas-works were geographically situated at a disadvantage compared with the station, in which case a lower price might be allowed at the gas-works.

All gas undertakings should agree to sell at schedule prices and where coke is railed to sell at destination prices. This is a reversal of the present procedure in some areas where the starting price is the gas-works price, to which the railway rate is added in order to obtain the destination station price. This procedure is considered to be wrong, because the resulting price then varies as between one gas undertaking's coke and another's and does not necessarily have any relation to that of competing fuels. It is assumed, as stated earlier in this report, that the quality of coke produced will be improved and, in that case, the effect of this condition should be to encourage the production of a better quality coke all round and not to depress the price of the good qualities already in production.

For economic reasons it is usually necessary for the same set of prices to apply to the whole of a gas undertaking's statutory area. This would mean that a gas undertaking would be expected to rail coke to stations within its area at the same price as it would sell that coke into van at gas-works, so that it would be out of pocket by the amount of the railway rate. Hence the reason for averaging coke sales and for not comparing individual sales.

It is considered that, generally speaking, the schedules should allow a concession to larger buyers, but this should be shown in the schedules as a stated price for a fixed annual tonnage and not as a rebate or percentage discount. It is known that in some Districts it is preferred to charge merchants the higher price and to allow a rebate as and when they have taken tonnages for which lower prices are scheduled, and there would appear to be no objection to the continuance of such a practice if this were considered desirable by the District Coke Association.

Similarly, in each area the schedules should show an additional charge for deliveries in hundredweight lots.

It is recommended that the aim should be to have within the area of each gas undertaking at the most two sets of prices for coke—namely, one for large and another for all sized coke, the additional charge for the latter being as uniform as possible throughout a District Coke Association's area. When this has been achieved the coke price schedule should be based on the price for sized coke, showing a reduction for large, and the schedule price for coke delivered to consumer's premises should be for the sale of sized coke in bags, with a proportionate reduction for bulk deliveries. It is appreciated that in some Districts this would be a departure from present practice, but upon agreement it could be put into effect as and when there was a reduction in coke prices.

There should be co-operation between District Coke Associations on price matters. Thus, when one Association had a fixed schedule of prices it should enter into an agreement with other similarly constituted Associations mutually agreeing to respect one another's prices when selling in one another's areas. Also, when fixing prices in borderline areas there should be close collaboration to avoid anomalies.

Arrangements with Distributors.—It is considered that a District Coke Association cannot function fully without a proper arrangement with its distributors, and experience has shown that the formation of a Coke Distributors, Branch is essential. Any such arrangement must have a background of goodwill because, obviously, distributors will not bind themselves to sell at prices fixed by a District Coke Association and conform to its rules unless they had some surety that they would be recognized by the gas undertakings as partners in the sale of coke. They should be regarded, not as competitors to the gas undertakings, but as additional salesmen for gas coke. They have a right to expect a voice in the fixation of prices and in the framing of rules, and to anticipate an adequate reward for their services. It should be recognized that they are in business for the sale of fuel, and very naturally concentrate on those fuels which give them the best and most stable return.

The basic principle underlying the constitution of a Distributors' Branch is that all distributors should undertake to observe the minimum prices and rules of the parent Association.

From the point of view of District Coke Associations a Coke Distributors' Branch could only be successful if all gas undertakings agreed beforehand to sell their coke at merchants' prices exclusively to those distributors who had joined the Branch.

The Branches in the different Districts should be constitutionally the same, allowing for local circumstances, and each should compile a register of its members to be mutually respected. The compilation of a national register was considered, but it was thought to be impracticable.

It is recommended that a distributor should belong to the Branches covering every area in which he trades. This is chiefly for disciplinary reasons because, unless and until each District Coke Association has identical rules and regulations, it would be difficult for the appropriate Committee of, say, Branch A to consider a complaint against a merchant who, being a member of Branch B, had traded in the area covered by Branch A and broken the rules of that Branch. Furthermore, with such a detailed price structure as is suggested in the report, it would be unfair to expect any one Branch to keep in touch with each distributor so as to know in which districts he was trading, and to keep him informed of the prevailing prices in those districts.

Other matters which fall under this heading of "Arrangements with Distributors" are as follows:

Factors and Factorage.—For the purpose of this report the terms "factor" and "merchant" are understood to have the following meanings: A factor is a person or firm selling coke to a merchant for re-sale; a merchant is a person or firm selling coke to a consumer.

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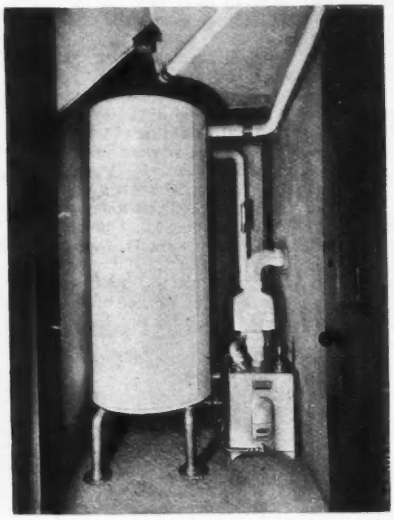

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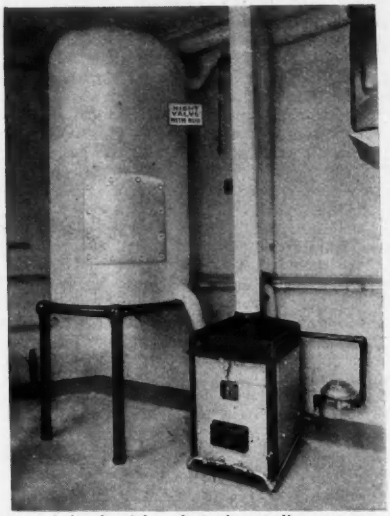

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It is possible for one firm to be both factor and merchant, the former when selling to a merchant and the latter when selling to a consumer, but in no case could they be recognized as performing both functions in any one transaction.

For factoring transactions, as defined above, there should be a standard allowance. This is arranged by the gas undertaking consigning coke to the factor's merchant customer and invoicing it to the factor at that merchant's destination price, less factorage. The factor, therefore, remains responsible to the gas undertaking for the transaction.

Factors would be members of the Coke Distributors' Branches in the same way as merchants but, unlike merchants, they usually trade nationally or over large areas. They should have suitable representation on all Distributors' Committees in all District Coke Associations' areas because, being large buyers, they are helpful in framing policy and in assisting merchants, particularly the smaller ones.

The London and Counties Coke Association and the Midland Counties Coke Association have found it necessary to form a Factors' Roll in order to limit the payment of the factorage allowance referred to above to those firms who are eligible to be classed as factors. This is because payment of factorage represents a reduction in the gas undertakings' price which can be fully justified in the case of genuine factors by reason of the service they render in the sale of coke, but which should not be unduly extended.

It is recommended that there should be a National Factors' Roll, and that the two Rolls now in being should form the nucleus. When other District Coke Associations have formed their Coke Distributors' Branches and are ready to proceed they could consider whether they wished additional firms to be added.

The formation of a National Factors' Roll Committee would be necessary with producers' and factors' representatives from each co-operating District Coke Association's area. This representation should bear relation to the tonnage of coke sold to factors by gas undertakings in each District.

Merchants' Margins.—The term "merchant" means here a man or firm with some standing and not a hawker, dealer, or haulage contractor. A firm engaged purely in haulage work—that is, delivering coke to consumers for a gas undertaking or for a consumer who has purchased coke at the works—is excluded from these recommendations.

It is recommended that each District Coke Association should agree with its Coke Distributors' Branch fair and reasonable margins as basic assessments in each locality. This may well prove to be one of the most difficult problems, and if tackled during the war reference will almost certainly be made by distributors to present coal margins. It will be remembered that present-day coal margins are maxima, not mimima, and will not necessarily be maintained at their present level; it should also be remembered that they apply only to retail sales. On the other hand, coke schedules, as recommended in this report, would give and maintain a fixed margin which would apply both to retail and to contract (or wholesale) business. Therefore, it would not necessarily be correct to adopt margins obtainable on other fuels without a proper investigation.

It is considered desirable to standardize the basis for margins in each District by taking, for instance, a merchant buying 100 tons per annum and delivering to consumers' premises in one ton lots and basing calculations on such transactions. It would be found that a larger merchant would need to buy at a lower price because he has to maintain an office and organization which the smaller merchant does not necessarily have, and also he would have a percentage of contract consumers' business which he would have to average with his other deliveries.

Factors' and Merchants' Standard Forms of Contract.—It is recommended that gas undertakings should be encouraged to enter into written annual contracts with distributors—*i.e.*, factors and merchants. It is expected that at the beginning of the coke contracting year each undertaking would estimate its annual make of coke, and would decide upon the percentage which could be allotted for sale to distributors and would invite contracts for that tonnage. Larger undertakings would probably accompany their invitation with a list of stations to which they would be prepared to consign coke by rail at schedule destination prices, whereas others would probably confine their invitations to places within their own area only and, possibly, in the case of those with no railway siding the invitations would be merely for van sales *ex* works.

There would be a distinction between a factor's and a merchant's contract. The factor's contract would be for tonnage only, because the price would not be known until the factor in turn had resold to his merchant customers, but as a protection the gas undertaking would undoubtedly indicate the limit of the area or stations to which it was prepared to consign on the order of the factor at schedule destination prices. Merchants' contracts would be for a definite tonnage and for stated destinations.

Liaison Between Solid Smokeless Fuel Industries.

Through the Solid Smokeless Fuels Federation co-operation is already established between the National Federation of Gas Coke Associations, the British Hard Coke Association and the South Wales Anthracite and Dry Coal Committee, and that Federation has a Technical Committee. It is suggested that, for the time being, these contacts would suffice.

For the remainder, the report is directed towards the development of a gas coke policy and the formation of strong District Coke Associations. When that has been accomplished it is anticipated that the National Federation of Gas Coke Associations will make such other arrangements with the other solid smokeless fuel industries as seem best having regard to the circumstances existing at that time; or it may be that the requirements of national planning may necessitate certain action in the meantime.

It is appreciated, however, that in addition individual District Coke Associations will need to make local arrangements with the appropriate local hard coke (and where applicable anthracite) organizations, where this has not already been done, particularly in those areas where production of those fuels is equal to or greater than the production of gas coke. This is considered to be essential.

Where such arrangements have not yet been made, it is anticipated that the local hard coke organizations will be disinclined to commit themselves without the previous consent of the British Hard Coke Association, which is their national and governing body. It is recommended, therefore, that District Coke Associations should keep the General Committee of the Federation informed as to the progress of local negotiations so that, where necessary, that Committee could advise and assist.

In the London and Counties Coke Association and Midland Counties Coke Association areas, where such co-operation was established prior to the war, this is based on a working arrangement providing for co-operation on all matters concerning price regulation (including initial price-fixing), the Coke Distributors' Branch, &c. The Gas Coke Associations remain independent bodies in all other respects and receive no monetary contributions from the hard coke producers. In Yorkshire, where the proportion of hard coke is greater than in the other Districts mentioned, there is a Joint Gas and Hard Coke Association which is the governing body for that area to fix prices and to negotiate with distributors. Similar conditions exist in part of the North of England Gas Coke Association's area. It is suggested that, in cases of this kind, it would be necessary to maintain Gas Coke Associations in order to continue membership of the Federation, but there would have to be some dividing line in those Districts showing which parts of this report would apply to the Gas Coke Association and which would apply to the Joint Association.

Advertizing and Propaganda.

The Committee is of the opinion that all gas coke advertizing and propaganda should be co-ordinated nationally and conducted under the aegis of the National Federation of Gas Coke Associations.

It is considered, however, that direct advertizing to the consumer may not be the first objective, but rather the development of a first-class technical service as suggested earlier in the report, supported by a nucleus of technicians in each District to advise the public how to use coke and then, as necessary, to embark upon a Press campaign to sell that service.

This suggestion is made because coke does not lend itself to press advertizing in the same way as certain other commodities which are able to tell a story convincing to the public as to why their products should be used in preference to others. As far as coke is concerned the public are misinformed and, in fact, have distinct prejudices against it because it has a bad tradition, is regarded as a waste product which is unpleasant to handle and has "dangerous fumes"; and it is thought to be anything but modern.

These are prejudices which it is felt could be better overcome initially by a technical service. That could be augmented by pamphlets or brochures directed towards specific uses for coke. The personal contact with heating and ventilating engineers and builders, mentioned previously, could be backed up by suitable advertizements in appropriate professional and trade journals, also by advertizing the technical service.

It is recommended that advertizing and propaganda should be under the direction of a National Advertizing Committee made up of representatives from District Coke Associations. That Committee would appoint advertizing agents and would be responsible for the development of all media.

Conclusion and Recommendations

The Committee feels that the framework of this report is essential for the proper marketing of coke.

Much of the work recommended has already been accomplished. The National Federation of Gas Coke Associations is established, and there is either an Association or the nucleus of one covering the whole of England, Scotland and Wales.

In general, it is recommended that a constructive policy for gas coke should be shaped nationally without delay and, in so far as possible, put into immediate operation in the Districts.

More detailed recommendations arising out of the report are:

1. That there should be an active District Coke Association in every area, each to be a member of the National Federation; and that to enable long-term plans to be developed all these should have an agreement of at least five years' duration.

2. That each District Coke Association should pursue an active coke policy and should persuade every constituent member to do likewise, by giving to coke a place in their sales development plans proportionate to the revenue which it produces.

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3. That each District Coke Association which has not yet done so should negotiate with distributors and form a Coke Distributors' Branch to be financed by the Association but to be an independent unit.

4. That the District Coke Associations in conjunction with the Coke Distributors' Branches should build up a coke price structure on the lines suggested in the report. (While present Government control may preclude full development of these plans, it is suggested that the present time affords an opportunity to make considerable progress in establishing a basis for post-war action.)

5. That each District Coke Association should negotiate with local hard coke and/or anthracite organizations, where appropriate, with a view to obtaining their co-operation.

6. That each District Coke Association should set up a Technical Committee and, if possible, appoint at least one Technical Assistant as a permanent full-time official.

7. That a National Technical Committee* should be formed, and plans made for other technical development as suggested in detail in this report.

8. That coke advertizing should be carried out under the National Federation of Gas Coke Associations; and that steps should be taken through the technical staffs of the Federation and District Coke Associations and by advertizing and propaganda to popularize the use of coke.

9. That negotiations with outside bodies, such as the Ministry of Works and Planning, appliance manufacturers, heating and ventilating engineers, &c., should be opened as soon as possible on a national basis. This would be in conjunction with the work already being done by the Solid Smokeless Fuels Federation Technical Committee.

* This Committee has been established.

Production of Road Tars

Improvements in the production of road tars, suitable either for direct application to a road surface, or for admixture with a mineral aggregate to form a carpet dressing for application to a road, are described in a patent specification (No. 558,674) granted to Woodall-Duckham (1920) Ltd., and E. Arnold.

The process is mainly, though not exclusively, applicable to "high aromatic" tars, which include tars and pitches produced in coke ovens and horizontal retorts. Road tars or pitches produced from high-aromatic tars, state the patentees, suffer from the general defect that thin layers thereof become brittle when subjected to temperatures slightly below normal atmospheric temperature, and consequently tend to crack and peel off from the mineral components of the road during winter, allowing moisture to penetrate the body of the road and thus leading to rapid disintegration of the surface.

The object of the patent is to produce from road tars which are susceptible to embrittlement at temperatures slightly below atmospheric, but which are otherwise satisfactory, a product which does not suffer from this defect, and which are referred to in the specification as "non-embrittling" tars.

A suitable laboratory test for embrittlement, and one which was employed in assessing the products of the present invention, is to distil the product till a temperature of 300°C. is reached in the vapour and to apply a 1 × 2 in. film of the residue, 0.5 mm. thick, on one side of a thin metal strip 1 × 4 in. in size, to heat the strip momentarily to 105°–110°C. to eliminate air bubbles, and then to expose the strip to a temperature of −5°C. for two hours, for example, by immersing it in a liquid maintained at this temperature. Then, while maintaining the metal strip at this temperature, it is bent into the form of a U : if the tar film cracks, it is considered that the tar is susceptible to embrittlement, and is unsuitable as a road tar. Tests carried out over a range of temperatures will serve to indicate the actual temperature at which the material becomes brittle.

A process has been described for the production of a tar composition for road constructional and coating purposes, said to have enhanced moistening properties, which consists in adding to a road tar (which may contain added bitumen) 3 to 20% or more of an oily product such as Dippel's oil, bone oil, crude shale oil, or shale tar. It has also been proposed to improve the drying properties of a road tar or tar/bitumen mixture by adding thereto an oily fluxing medium or diluent, including crude shale oil or, preferably, the residue remaining after a crude shale oil has been "topped" up to 190°C.; it was stated that the topped product, being richer than the crude shale oil in unsaturated compounds and in asphaltic matter, will render ordinary tar or even pitch non-brittle, and may therefore be used for the preparation of road tar from pitches.

According to the patent a non-embrittling road tar is prepared by intimately mixing with a road tar of suitable character and viscosity, but which is susceptible to embrittlement, a proportion of either a "sludge residue," or a "still grease," or a "crude paraffin wax," all obtained in or derived from the refining of crude shale tar. Good mixing of the two components is assisted if the operation is carried out in the warm.

According to a further feature, a product for addition to a road tar for improving the non-embrittling properties of the tar comprises a substantially neutral mixture of the acid tar sludges and the alkaline tar sludges obtained in the refining of shale tar distillates with acid and alkali respectively, which mixture has been dehydrated and distilled to remove lower and middle boiling oils, and is designated as "sludge residue."

The refining of crude shale tar is effected in the following manner. The crude tar is distilled to coke, and in this primary distillation there are obtained the following products:

(1) Non-condensible gases (1–2 cu.ft. per gallon of shale tar).
(2) Crude naphtha (sp.gr. 0.74 to 0.76).
(3) So-called "crude distillate" or "once-run oil" or "green oil," being the fraction between crude naphtha and coke.
(4) A residue of coke (approximately 3% by weight of the shale tar).

The once-run oil is refined with concentrated sulphuric acid at 100°F., agitation being effected by means of compressed air, and the resulting acid tar sludge is run off. The oil is washed with water and is then treated in a similar manner with an aqueous solution of caustic soda; a so-called soda-tar sludge is formed and is separated.

The refined once-run oil is fractionated and the following products are recovered in sequence:

(1) Heavy naphtha.
(2) Illuminating oils.
(3) Gas-oil or fuel oil.
(4) Lubricating oils.
(5) Paraffin wax, which is purified by recrystallization or "sweating."
(6) Still grease, which is the distillate passing over at the end of the distillation period.
(7) Still coke, which remains in the still at the end of the operation.

The various distillates, with the exception of the still grease, are further refined with sulphuric acid and caustic soda solution as in the case of the once-run oil.

The acid and soda tar sludges obtained from the various refining steps specified are mixed together in such proportions that the free acid and the alkali approximately neutralize each other, and the resulting substantially neutral sludge is ordinarily used as a fuel for heating the stills. This sludge forms the starting material for the "sludge residue" employed in the present process, which is illustrated by describing its application to a road tar which in the untreated condition has a tendency to embrittlement at low atmospheric temperatures. The road tar in question is obtained by oiling back with creosote oil, a by-product coke-oven pitch having a Kraemer & Sarnow softening point of 67°C. This cut-back road tar had a viscosity at 30°C. of 69 seconds (British Road Tar Association viscometer). When the road tar was distilled, the amounts of the various oils were:

To 200°C.	0.7% by weight.
200–270°C.	10.9% ,,
270–300°C.	4.1% ,,

The residue remaining above 300°C. had a K. & S. softening point of 41°C., and showed signs of embrittlement when exposed for two hours to the comparatively high temperature of 15°C. in the metal-strip test above described.

Addition of Distilled "Sludge Residue" to Road Tar.—The neutral sludge (obtained by mixing the acid tar sludges and the alkaline soda tar sludge from the various refining operations on the distillation products of crude shale tar) is converted into a product for use in the present process by dehydration and distillation up to a temperature sufficient to remove light and middle oils. A vapour temperature of about 300°C. is suitable. The neutral sludge in question gave on distillation to this temperature:

Water	6.8% by weight.
Oils	14.1% ,,
Residue	77.1% ,,
Loss	2.0% ,,

Apart from some H_2S evolved principally during the dehydration, no other gas such as SO_2, &c., could be detected. The distillation residue forms the "sludge residue" employed. This was of the colour of tar. It had a viscosity at 35°C. of 535 seconds (British Road Tar Association viscometer) and at 50°C. of 46 seconds. The gross percentage of free carbon was less than 0.1%. The properties of mixtures of various proportions of the above specified road tar and the sludge residue are shown in Table I.

TABLE I.

Composition, % by wt.—					
Road tar	80	85	90	95	100
Sludge residue	20	15	10	5	*Nil*
Properties—					
Viscosity at 30°C. (British Road Tar Association) seconds	96.5	90	83	76	69
Sp.gr. at 60°F.	1.169	1.179	1.189	1.200	1.210
Distillation, % by wt. to 200°C.	0.0	0.0	Trace	Trace	0.9
200-270°C.	8.7	9.0	9.5	10.2	10.9
270-300°C.	4.3	4.3	4.2	4.1	4.1
K. & S. softening point of residue from distillation to 300°C.	29.0°C.	32.7°C.	34.0°C.	38.4°C.	41.0°C.
Embrittlement shown at...	Below −5°C.	Below −5°C.	Below −5°C.	Between 0 and −5°C.	+15°C.

(*To be continued*)

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

GAS PRODUCTS PRICES—STOCKS AND SHARES

The London Market Aug. 14.

A Government Order came into effect on March 1 controlling the price of Benzole and Coal Spirit and replacing the Control of Coal Tar Naphtha and Xylole Order, 1943.

The Order is known as the Control of Benzole and Coal Spirit Order, 1944 (S.R. & O. 1944, No. 172).

By this Order the price of Motor Benzole is fixed at 2s. per gallon. The Order also lays down the method of evaluating Crude Benzole.

The Order also calls for periodical returns to the Ministry of Fuel and Power from all producers of Crude and Refined Benzole.

The only item of interest in connexion with the Coal Tar products market is the issue of Government Order designated the Control of Toluene (No. 4) Order, 1944 (S. R. & O. 1944, No. 170), which contains an amendment of the Control of Toluene (No. 3) Order, 1943.

Prices of Coal Tar products are unchanged.

The Provinces Aug. 14.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 1s. 11d. to 2s. 1d., pure, 2s. 7½d. (controlled by the Control of Toluene No. 3 Order, dated July 14, 1943, operative from July 20, 1943). Benzole and Coal Spirit, also Coal Tar Naphtha and Xylole, are now controlled by the Control of Benzole and Coal Spirit Order, 1944, dated Feb. 18, 1944, S. R. & O. 1944, No. 172, operative from March 1. Carbolic acid, 60's, naphthalene, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil controlled by the Coal Tar Products Prices Order, 1943, dated Oct. 20, 1943 (S. R. & O. 1943, No. 1528), operative from Nov. 15, 1943.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Scotland Aug. 12.

Export demand is strong, but supplies for that purpose are limited. Refined tar*: Yield to distillers is 4¼d. per gallon *ex* Works, naked. Creosote oil: Timber preserving quality,* 5¼d. to 6½d.; hydrogenation oil,* 5¾d.; low gravity or virgin oil,† 7¼d. to 7¾d.; benzole absorbing oil,* 6¼d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha†: 6¼d. to 7d. per gallon. Solvent naphtha*: Basic prices delivered in bulk, 90/160 grade, 2s. 8d., and 90/190 Heavy naphtha, Unrectified, 1s. 10½d.; Rectified, 2s. 2d. per gallon. Pyridine†: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

The good war news over the week-end gave a fillip to markets at the opening last week and there was a good volume of buying orders. Gilt-edged stocks were particularly firm. Toward the close, however, some pre-week-end selling caused some hesitancy and a number of falls in value were registered, especially among industrials, although these rarely exceeded the turn.

There was more activity among Gas stocks and shares and prices closed firm, with the majority of changes in an upward direction. The chief gains were in Gas Consolidation ordinary, which closed 1s. 3d. higher, and Plymouth and Stonehouse, with a rise of 4 points to 112½. Bombay gained 1s., and Primitiva Holdings hardened on the result of the company's appeal to the Federal Court.

The following is the full list of changes during the week to Thursday last:

PROVINCIAL EXCHANGES

Bath Cons.	114—116	—
Blyth Ord. (x.d.)	120—122	Aug. 8
Chester Ord. (x.d.)	98—102	July 31

OFFICIAL LIST

Bombay	35/6—37/6	+1/-
Gas Consolidation "A" Ord. ...	21/3—22/3	+1/3d.
Gas Light Units	22/3—23/3	—/3d.
Imperial Continental	96—99	—
Mid-Southern Utility "C"	103—108	+3
Plymouth & Stonehouse Ord. ...	110—115	+4
Primitiva Holdings Ord.	9/—11/-	+1/-
South-Eastern Gas Corporation Ord.	20/6—21/6	+/3d.
Ditto 4½ p.c. Red. Cum. Pref. ...	20/6—21/6	+/3d.
South Metropolitan Ord.	88—91	—1
Tottenham Ord. (x.d.)	112—117	Aug. 8
Ditto 5 p.c. Pref. (x.d.)	107—112	"
Watford Ord. (x.d.)	112—117	"

SUPPLEMENTARY LIST

Plymouth and Stonehouse 5 p.c. Deb.	116—121	+1

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Gas Calorimeters, Gravitometers and Gas Density Recorders, Aeration Test Burners, Gauges and Recorders, Wet Meters, Gas Analysers Photometers, Thermometers.

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The King Electric Chain Pulley Blocks are built for continuous heavy duty. Three models available—Minor, Major, and Mammoth—ranging in capacity from 5 cwt. and 10 tons.
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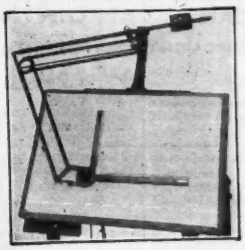

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Simple to Fit and to Operate They give the Best Service Obtainable

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Tins for Sale to Consumers. In Bulk for Works Use.

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APPOINTMENTS VACANT

COUNTY BOROUGH OF MIDDLESBROUGH

(GAS DEPARTMENT)

WORKS SUPERINTENDENT

APPLICATIONS are invited for the above appointment. Salary £400, rising by annual increments of £25 to £450, inclusive of bonus. Free house provided on Works, together with fuel and lighting. Applicants must have experience of full Gas-Works routine (including control of Retort Settings and C.W.G. Plant). The whole of the supplies are normally obtained from adjacent coke ovens. Applicants must possess a sound knowledge and experience in the production of gas and all gas-works' ancillary plant. They must have a sound practical mechanical experience of the maintenance of plant, be strict disciplinarians, and able to control men.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination, and also to state in his application his position with regard to the Essential Works Order and the National Service Act.

Applications, stating Age, and giving full particulars of Experience and present position, together with copies of recent Testimonials, should reach the undersigned by Saturday, September 2, 1944, endorsed "Works Superintendent."

Corporation Gas-Works, Commercial Street, Middlesbrough.
JOHN W. PALLISTER, Gas Engineer and Manager.

MAIN AND SERVICE LAYER, fully experienced in laying and leakage work, required immediately. Apply in writing in the first place to the Managing Director, Gas-Works, Dudley, Worcs.

WANTED.—MAIN AND SERVICE LAYER. £4 5s. per 47-hour week.

STOREKEEPER, fully qualified, £5 minimum per 47-hour week.

TWO GASFITTERS. Wage, according to skill, 84s. 10d. to 91s. 4d. per 47-hour week.

Apply, stating Experience, position under National Service, with *copies* of Testimonials to Manager, East Hull Gas Company, St. Mark Street, Hull.

COUNTY BOROUGH OF WEST BROMWICH

(GAS DEPARTMENT)

TECHNICAL ASSISTANT

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT at a commencing salary of £325, rising by annual increments of £15 to a maximum of £370 per annum, plus the current war bonus of £49 8s. per annum.

Candidates must be experienced in the chemical control of gas-works plant, including vertical retorts, carburetted water gas plant, and benzole recovery.

The appointment will be subject to the provisions of the Local Government Superannuation Act, and the successful candidate must pass a medical examination.

Applications, stating Age, Qualifications and Experience, accompanied by *copies* of not more than three Testimonials, must be delivered to the undersigned not later than Monday, August 28, 1944.

Candidates should state their position in relation to the Essential Work Order and military service.

Gas Department, 324, High Street, West Bromwich.
D. GREEN, Gas Engineer and Manager.

August 10, 1944.

SKIPTON URBAN DISTRICT COUNCIL

(GAS DEPARTMENT)

APPLICATIONS are invited for the position of DISTRIBUTION FOREMAN. Applicants should have a knowledge of modern gasfitting and mainlaying practice and experience in the supervision of workmen. Commencing wage £5 4s. 8d. per week (inclusive of war bonus).

Applications, with *copies* of two Testimonials, and stating Age, Training and Experience, must be received not later than Monday, September 4, 1944. Applicants should indicate their position in relation to Military Service and the Essential Work Order.

The appointment is subject to the passing of a Medical Examination, and canvassing members of the Council will disqualify.

Gas Offices, Skipton.
L. B. CHAPMAN, Engineer and Manager.

August 12, 1944.

APPOINTMENTS VACANT (*ctd.*)

NEWTON-ON-AYR GAS COMPANY, LIMITED

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT. Salary approximately £350.

Applications, stating Age, Qualifications, Experience, position with regard to Military Service, together with *copies* of recent Testimonials to be delivered to the undersigned not later than August 31, 1944.

The Clydesdale Bank, High Street, Ayr.
R. J. HASTINGS, Secretary.

BOROUGH OF CAERNARVON

(GAS DEPARTMENT)

WORKS FOREMAN

APPLICATIONS are invited for the position of WORKS FOREMAN from persons who have experience in the control and supervision of Horizontal Retorts, Water Gas Plant, Benzole Plant, and the maintenance of Boilers, Exhausters, Pumps, and all General Works Plant and Machinery.

Experience in the supervision of labour is essential.

Salary £260-£280 per annum, plus War Bonus, which is at present approximately £49. House available.

The post is designated under the Local Government Superannuation Act, 1937, and the successful applicant will require to undergo a medical examination.

Applications endorsed "Gas-Works Foreman," stating Age, Qualifications, Experience, and position regarding Military Service and the Essential Works Order, accompanied by *copies* of two Testimonials, should be received by the undersigned not later than August 23, 1944.

Guildhall, Caernarvon.
W. PHAIRN, Engineer and Manager.

COUNTY BOROUGH OF BURY

APPOINTMENT OF
GAS-WORKS SUPERINTENDENT

APPLICATIONS are invited for the position of WORKS SUPERINTENDENT at a salary of £475, rising to £500 per annum by two annual increments of £12 10s. (inclusive of the present war bonus).

Applicants should possess the Institution of Gas Engineers' Higher Grade Certificate in Gas Engineering, and have experience in modern gas-works practice and the control of men.

Applications endorsed "Gas-Works Superintendent," stating Age, Qualifications and Experience, and accompanied by *copies* of three recent Testimonials, should be forwarded to the undersigned not later than September 6, 1944.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the person selected will be required to pass a medical examination.

Candidates must state their position in relation to the Essential Work Order and National Service.

Municipal Offices, Bank Street, Bury, Lancs.
H. D. A. ROBERTSON, Town Clerk.

August 11, 1944.

STRETFORD & DISTRICT GAS BOARD

SENIOR TECHNICAL ASSISTANT

APPLICATIONS are invited for the position of SENIOR TECHNICAL ASSISTANT. Applicants must have practical experience in the control and operation of Horizontal Retorts, with mechanical stoking, coal and coke handling plants, benzole extraction and concentrated liquor plants, and be capable of carrying out any necessary chemical tests on the plant. Experience in the control and handling of labour essential. Possession of the Higher Grade Certificate of the Institution of Gas Engineers (or equivalent qualification) is desirable

Commencing salary £400 plus current War Bonus £48 per annum. The appointment will be subject to the provisions of the Local Government Superannuation Act,

Applications, in sealed envelopes, endorsed "Senior Technical Assistant," accompanied by *copies* of recent Testimonials, stating Age, Experience and Qualifications, and present position, also position under Military Service Acts and Essential Works Order, should be received by the undersigned not later than Friday, August 25, 1944.

Gas-Works, Longford Road, Stretford.
JAMES CARR, Engineer, General Manager and Clerk.

August 8, 1944.

COMPANY NOTICES

THE BARNET DISTRICT GAS & WATER COMPANY

NOTICE IS HEREBY GIVEN that the TRANSFER BOOKS of this Company relating to ORDINARY and PREFERENCE STOCK WILL BE CLOSED on the 17th August, 1944, and RE-OPENED on the 2nd September, 1944.

Offices: Station Road, New Barnet, Herts.
By Order of the Board, E. D. DAVEY, Secretary.

August 9, 1944.

SOUTH METROPOLITAN GAS COMPANY

NOTICE IS HEREBY GIVEN that the TRANSFER BOOKS of the Preference Stocks of this Company WILL BE CLOSED from August 21st to August 30th, 1944, both dates inclusive, for the preparation of warrants for an Interim Dividend on these Stocks payable on September 1st, 1944.

709, Old Kent Road, S.E. 15.
By Order of the Board, F. G. BREWER, Secretary.

August 12, 1944.

PLANT &c. FOR SALE & WANTED

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FOR SALE.—Galloway BOILER 20 ft. by 6 ft. and 14 ft. by 6 ft. ditto. 25 h.p. Crossley GAS ENGINE. 7 h.p. ditto. 35 kw. Browett Steam Set 220 vo. D.C. 3B and 6B Bonecourt Gas BOILERS.

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CYLINDRICAL Horizontal Multi-tubular Waste Heat BOILER by John Foster & Sons, Preston. 21 ft. by 6 ft. diam., fitted 140 tubes. Complete with mountings. 150 lb. W.P.—Cleckheaton Engineering & Motor Co., Ltd., Cleckheaton.

GAS ENGINEER in Reception Area for London evacuees appeals to London and Home Counties Gas Engineers for surplus second-hand cookers. Cash prices will be paid for cookers in any reasonable condition. Address No. 9360, "GAS JOURNAL," 51, High Street, Esher, Surrey.

FOR SALE.—Electrically-driven COKE BUS, gauge 2 ft. 8½ in.; capacity of skip, 10 cwt. Complete with spare parts in thoroughly good condition. For particulars apply Yorktown (Camberley) and District Gas and Electricity Company, Camberley, Surrey.

GAS ENGINE FOR SALE. Tangye 25 h.p. In good working order. Complete with cooling tank and pulsator. £45.—HECTOR & INGLIS, 160, Berkeley Street, Glasgow.

OFFERS are invited for a Rotary Station METER of 20,000 cu.ft. per hour capacity. Enquiries to the Engineer and Manager, Sedgley Gas Department, Lower Gornal, near Dudley.

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which has stood the test of 60 years.

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IT KILLS RUST

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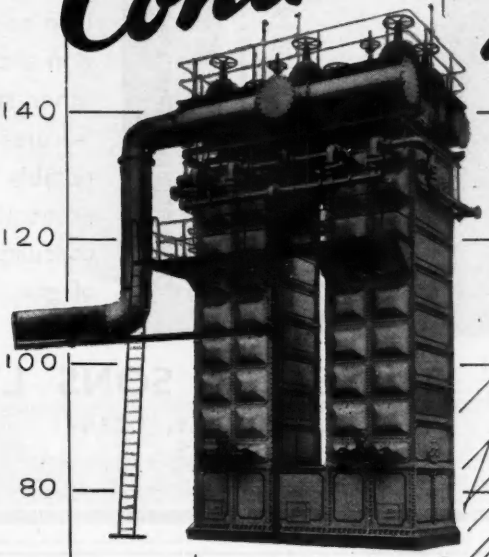

Individual investigation of each case is made by our Technical Staff, fully qualified by training and practical experience to advise on any problem relating to the treatment of gas for the recovery of by-products.

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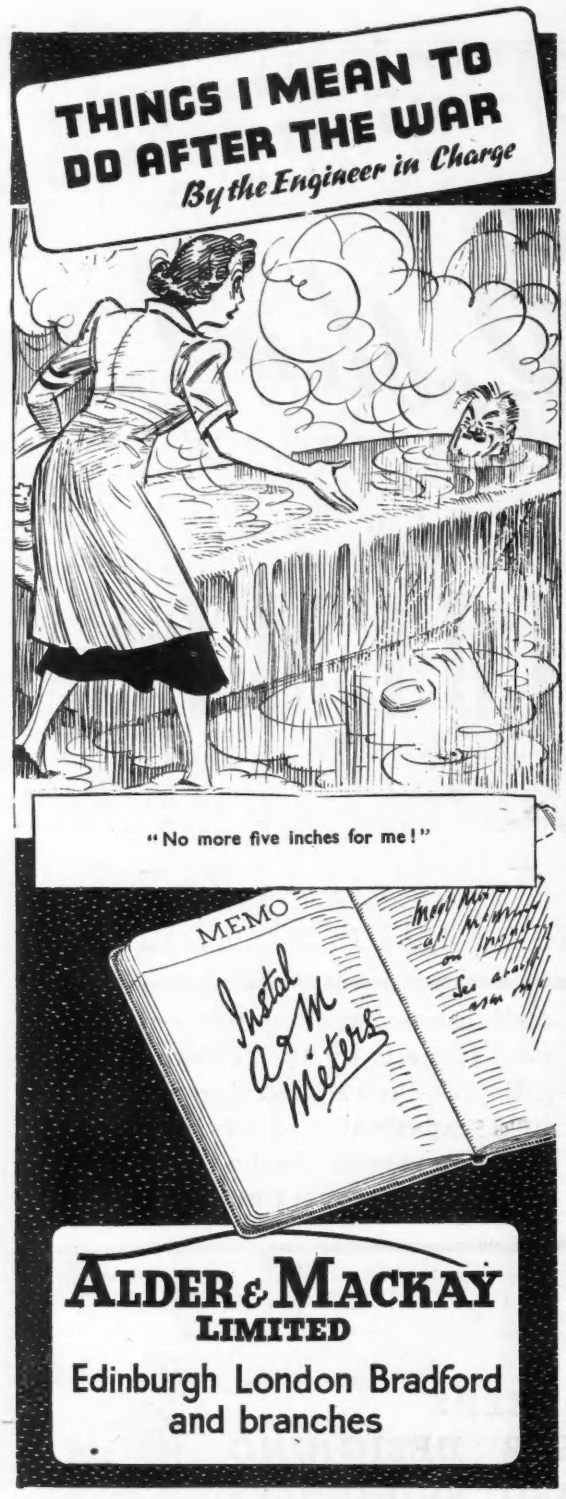

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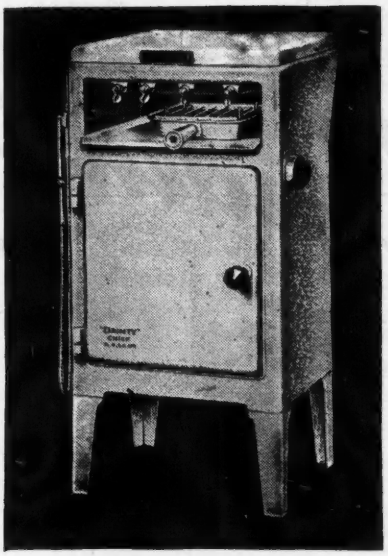
The name that matters on meters

The DAINTY Chief



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Buildings of every Type for the Gas Industry

Horizontal Retorts
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We specialise in construction and welcome your inquiries at any time for any of the plant mentioned.

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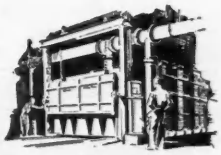
Arkon GAS FLOW RECORDERS and Gas Economy

It is not sufficient to know merely how much gas has passed along a main or been used in a heating process. *How* and *when* the gas was used is often of even more importance.

The Arkon Gas Flow Recorder gives a *permanent* record of the consumption of gas literally minute by minute.



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LEAD is under Government Control. Its use is permitted for essential and approved purposes against licence obtained by the manufacturers. The following are some of the high quality Lead products we manufacture and which, in their respective spheres, are as perfect as scientific research and long manufacturing experience can make them.

LEAD PIPES Compo. Improved Tellurium-Lead Pipes specially recommended for their unique resistance to vibration, frost, corrosion, creep, friction and other strains of service.

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WHITE LEAD PAINT Guaranteed Genuine. Supplied in Colours, and as White Paste in Oil.

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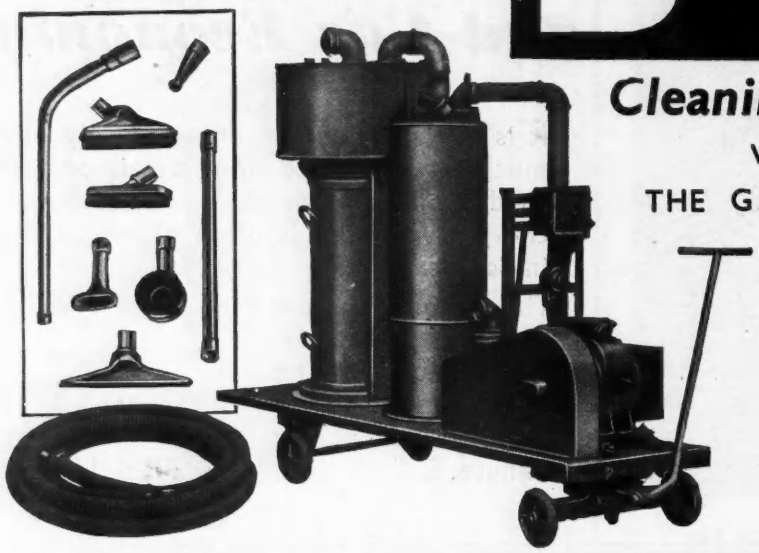

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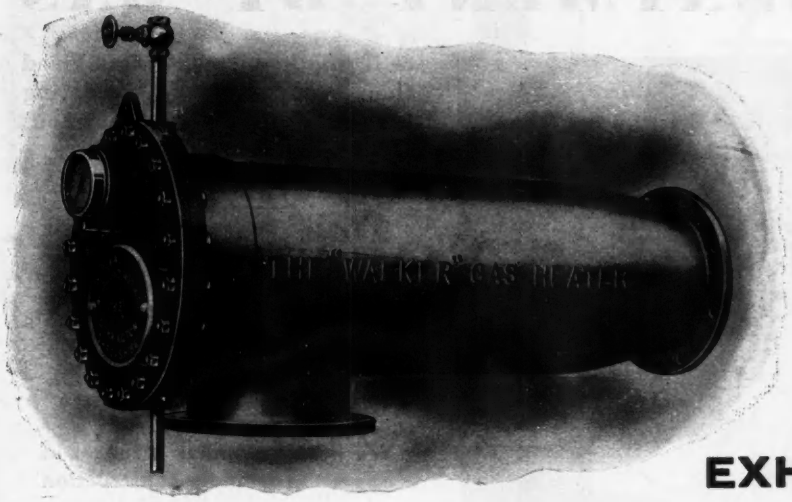

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UTILIZING
WASTE HEAT
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SUITABLE ALSO FOR LIVE STEAM

MADE IN SIZES FROM 6" UPWARDS

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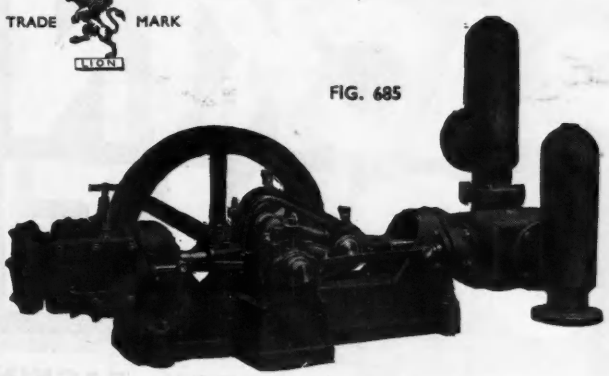

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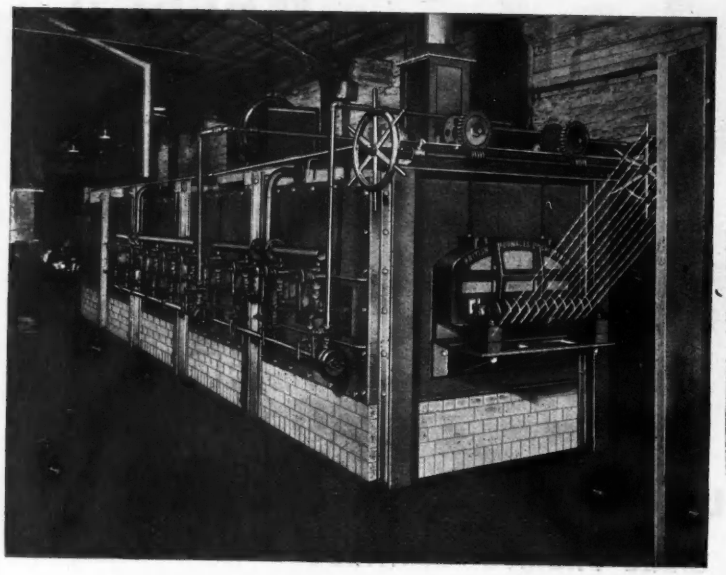

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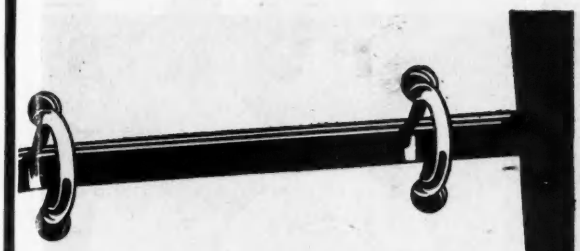

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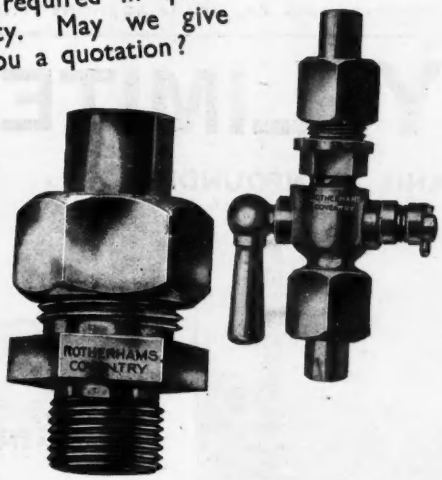

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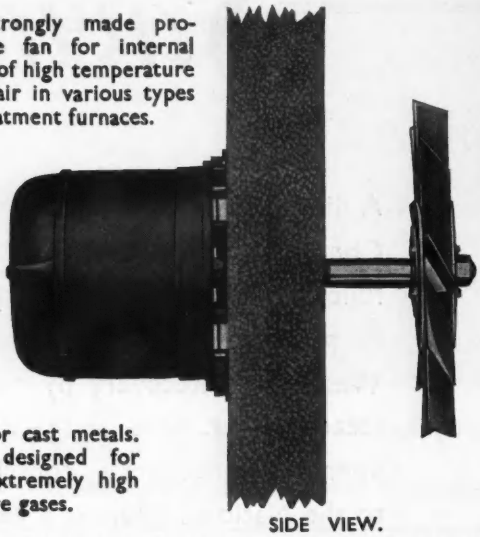
We invite your enquiries.



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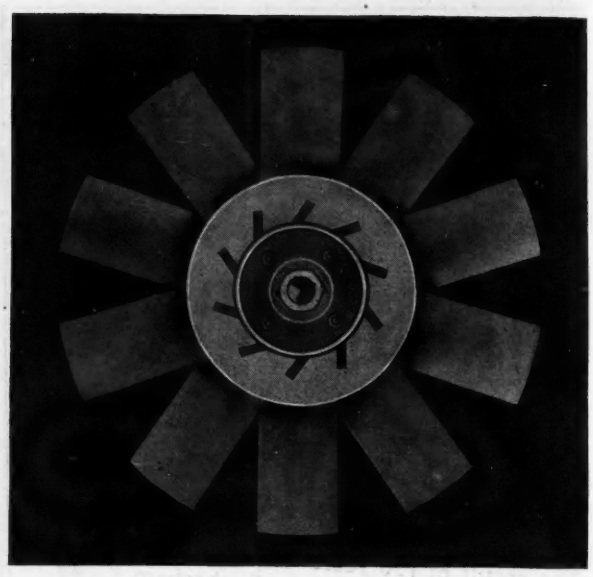

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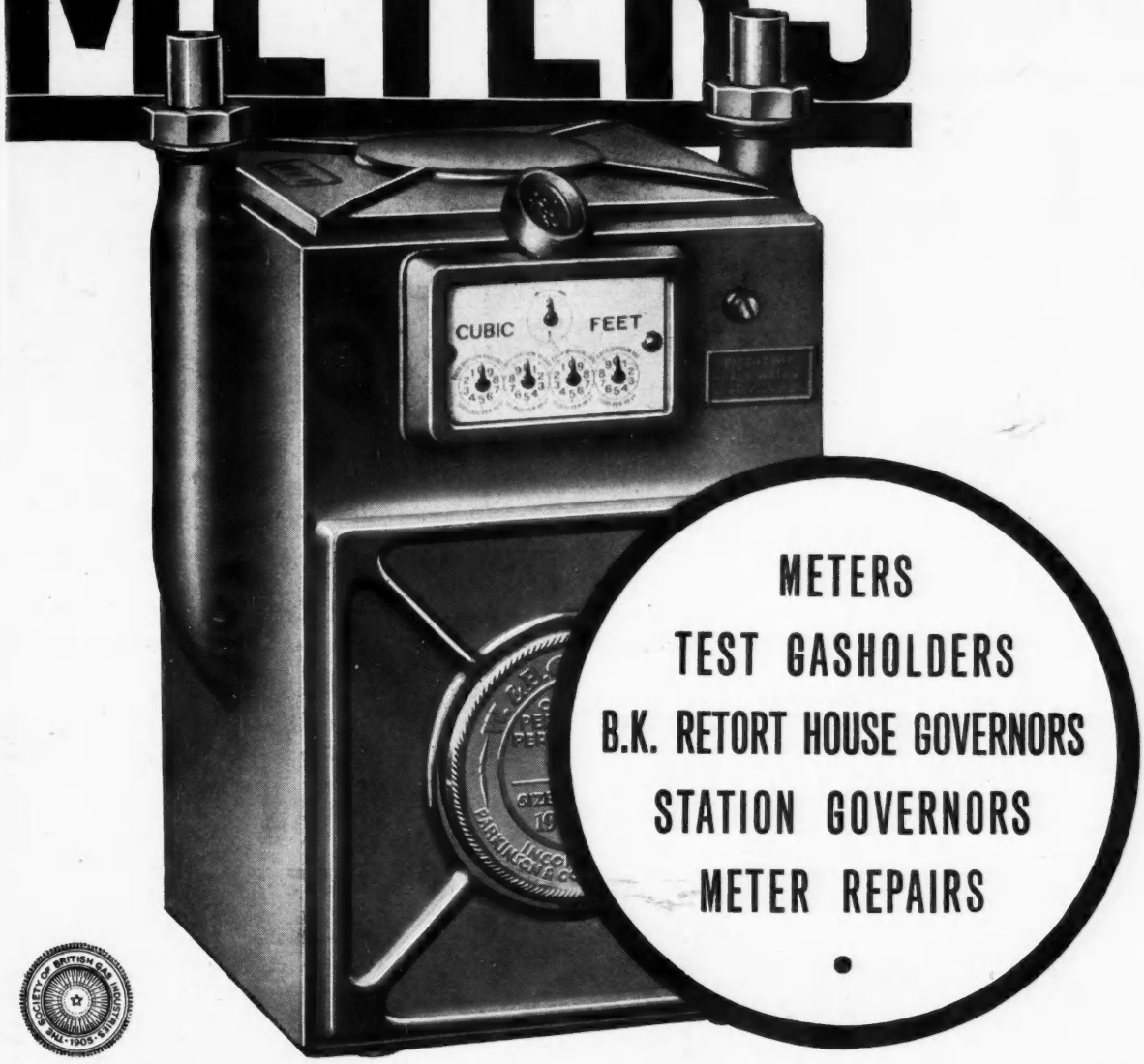

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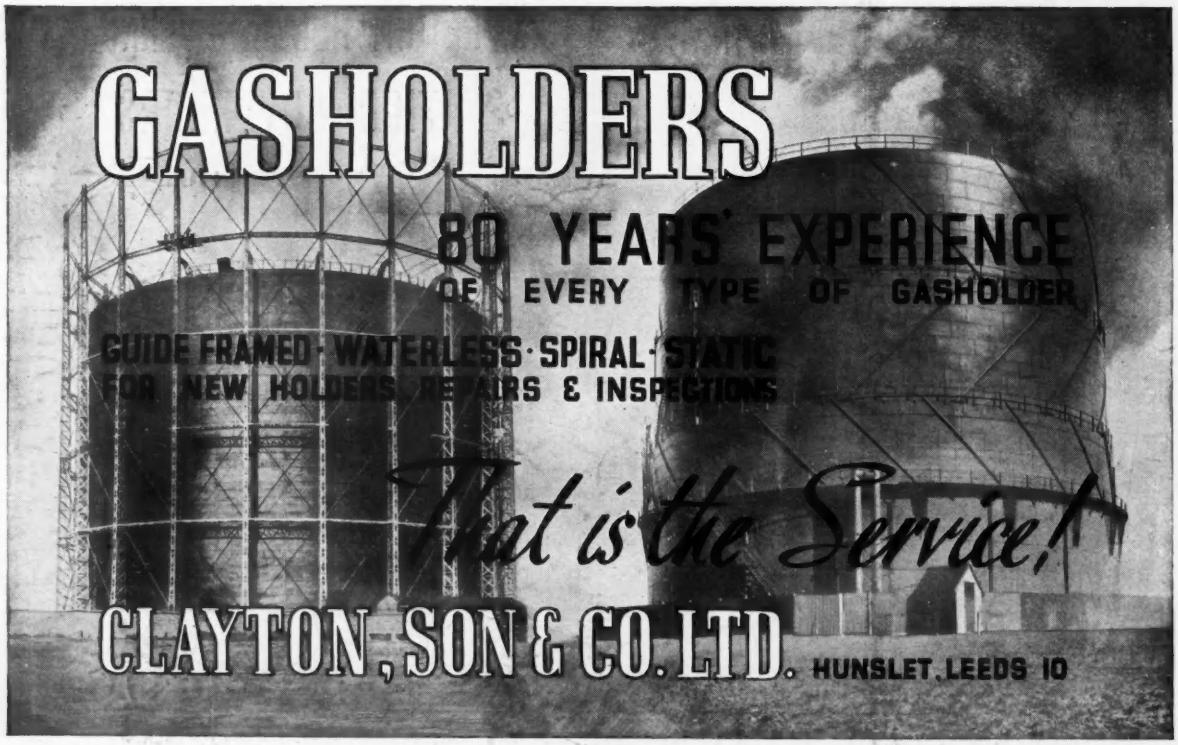
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